THE

VETERINARY JOURNAL

Editor :

FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING,
OFFICIER DU MÉRITE AGRICOLE (FRANCE),
CAVALIERE DEI SS. MAURIZIO E LASSARO (ITALY),
HONORARY MEMBER OF THE AMERICAN VETERINARY ASSOCIATION,
PRINCIPAL OF THE ROYAL VETERINARY COLLEGE, LONDON.

Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

SEPTEMBER, 1928.

Editorials

NATIONAL DOG WEEK.

BETWEEN the 23rd and 29th of this month there will be held in at least 400 towns of Great Britain and Ireland the celebration of National Dog Week—an affair which it is intended to carry on annually. Its objects are to help the welfare of our friend the dog, and any money collected will be given absolutely without deduction for expenses (as these are being borne by several philanthropic people) to some deserving object allied to dogs. This year it is the Canine Department of the Rebuilding Fund of the Royal Veterinary College, and it will therefore appeal very strongly to the readers of THE VETERINARY JOURNAL ; especially the old graduates of the Camden Town School.

A terrific amount of energy has been put into the scheme by Capt. Hobbs, the organising secretary, and his fellow-workers, who have distributed over 250,000 pamphlets of various kinds, and have got together committees, flag days, fêtes, lectures, dances, cinema shows, and last, but not least, greyhound races for which the first prize is no less than the sum of £5,000.

The actual amount of work devoted to the scheme by those who are responsible cannot be estimated, and the members of the veterinary profession have responded splendidly. Between the 23rd and 29th

will be seen the sequel to those united efforts, and there can be no doubt whatever that the result will reflect beneficially, not only upon the College funds, but upon the cause of the dogs themselves and the general public, including the members of the veterinary profession. The more the public take interest in dogs as pets and as valuable goods—or as means of adding to one's income—so much more will they become patients in veterinary *clientele* and thus replace the old-time equine practice in the day-book and ledger of the practitioner.

THE SCARCITY OF VETERINARY GRADUATES.

It is gratifying to note at the present time, in the advertisement and other columns of the Veterinary Press, the numbers of Colonial and home appointments which are advertised ; and it is a well-known fact that not only is there a paucity of suitable candidates, but even the general practitioner is experiencing considerable difficulty in finding help in the shape of assistants and *locum tenens*.

That this is a good augury for the future of the veterinary profession goes without saying, and there is no doubt that at last the tide has turned and the veterinary profession has a bright future in front of it—especially in Public Health work.

It is for the young graduate of to-day to see that he loses no opportunity of thoroughly equipping himself with all possible post-graduate degrees before he leaves the realm of study, and for those who have seats on the ruling bodies of the profession, whether it be the Council of the Royal College or the National Veterinary Association—to see that the opportunity is not missed to send forward representations to the proper authorities for proper and adequate recognition and remuneration ; as it is in this respect that we have failed grievously in the past—and largely through our own stupid modesty and our own silly fault.

XUM

General Articles

REFLECTIONS ON MILK FEVER AND ITS TREATMENT IN THE WEST OF SCOTLAND IN BYGONE DAYS.

By HUGH BEGG, F.R.C.V.S.,
Chief Veterinary Officer for the County of Lanarkshire.

THOSE of us who are old enough to have experienced the limbo of unenlightened servility to the various lines of laborious treatment of milk fever that were in vogue over 20 years ago can scarcely avoid the obtrusion of reminiscent reflections, bearing no ray of glory, regarding the results, worry, and tribulation we experienced in trying to cope with what was then a fell disease.

If it be permissible to recall such experiences, these notes may not be uninteresting to younger graduates who, with the heirloom of the great Schmidt's treatment at their command with its specific and speedy results, can have but little conception of how the bugbear of milk fever consumed the time and effort, and disturbed the tenor of the work-a-day life of the cattle practitioner.

A recital of the weary vigils with comatose or obstreperous restless patients; the protracted and too often unsuccessful ministrations; the repeated visits; and the exertions required to posit the patients, might appear to many, in these superior days, as highly ludicrous. But the star of the great chance discovery of Schmidt had not then appeared on the horizon, and though we were working hard, as well as groping in the dark, one may take leave to doubt, despite the therapeutic potency of udder inflation and the laudable efforts of researchers to determine the *vis a tergo* of the treatment, whether it is in any sense less empirical than any that preceded it.

In these early days many cows that recovered as well as those that died would remain abed for several days and put a great strain on the patience, experience and endurance of the nurse, and the tact, ingenuity and prognostic ability of the practitioner. The dire necessity of the situation, however, begat a race of experienced professional and lay cattle nurses, who could handle a recumbent cow expertly and who would be sadly missed to-day if we had a visitation of the old order of things.

With the speedy recoveries that follow the newer treatment, the need for perpetual attendance, day and night, has departed, and with it, the labour entailed in maintaining the patient in position,

XUM

for the victim is usually *compos mentis* in a short time and assumes of her own accord a safe recumbent position until disposed to get on her feet.

PROPHYLAXIS.—It is not to be wondered at that considerable effort was made in these times to prevent the occurrence of an affection that took such a heavy toll of cows at the zenith of their value and utility, and these consisted chiefly in the giving of aperient doses of medicine when the cow was about due to calve, and many adopted the expedient of putting their cows on short rations of sloppy food, such as bran mashes and treacle, for several days prior to calving. This plan, followed by so many, contrasts violently with that of Mr. Boutflour to-day, who asserts with confidence that he will guarantee the elimination of milk fever by his process of "steaming up" the most likely animals with an abundance of concentrated foodstuffs for a period before calving.

Incidentally, it is noteworthy that in a recent interview, which the writer had with him, he was asked to explain, in the light of his theory, how it happened in the later years of last century, that when, over a large area, many farms that had for years been jogging along producing butter and making use of home produce chiefly with a minimum of concentrates, cases of milk fever were seldom seen, but when they changed over to sweet milk production and began to feed heavily on bean and pea meals, etc., to maintain supplies for daily transport under contract, the deeper milking cows began to go down, as they continue to do till this day.

He offered the unrecorded explanation that immunity to milk fever under his system could not be obtained if the "steaming up" were done with bean or pea meals and brewers' grains. The system of the cow, he said, had to be fortified by other concentrates, such as ground-nut cake, etc.

Mr. Boutflour's successes are well authenticated, I understand, but as the plan is also empirical, even if it acts specifically (and I have no experience of it), it provides, in turn, a problem for the research worker, since the success or failure of any attempt to base it on whatever power it possesses to overcome a probable hypoglycæmic state, must share the fortune of hypoglycæmia as the condition held responsible for the symptoms of milk fever—a view that has been in some measure discarded.

Milk fever preventive powders were in great vogue 30 years ago, and chemists were not slow to take advantage of the situation. One of the commonest consisted of—

℞ Pulv. Gamboge ... ... ℥ vi.
Pulv. Sodii Chlorid ... ... ℥ vi.

M.F't. pulv. and add some pea meal to inhibit the deliquescence of the common salt.
Sig. Dissolve in a pint of tepid water and administer before parturition.

Such powders were bought in dozens by the larger stock-owners. The chief conception in the use of laxative food and these aperient drugs lay in the desire to overcome the apparent constipation encountered in most cases of milk fever. Many people attributed great success to the abundant use of common salt with food, both before and after calving. This acted aperiently and by creating thirst induced considerable lavage of the alimentary system. Many other more romantic endeavours were made in certain localities to ward off the complaint, but they are not worth recalling.

An historical survey of the "*curative*" treatment adopted is readily divisible into three periods of therapeutical fashion, viz. :—

1. Treatment by purgatives and stimulants.
2. Treatment by sedatives ; and
3. Treatment by udder injections and later by udder inflation.

1.—Treatment by Purgatives and Stimulants.

The treatment of milk fever by stimulants held sway up till 1890, when it was gradually displaced by the use of agents, the therapeutic action of which was presumably exactly the opposite of the stimulants hitherto employed.

Under the old regime the treatment in no case was considered properly begun until the animal had been bled and a full purgative dose of Epsom or Glauber salts and treacle followed by three or four gills of whisky had been administered to the animal. The bulk of fluid, so given initially, was seldom less than half a gallon. Thereafter, every three or four hours, three gills or so of whisky diluted were administered, and in many cases by the time the animal died, or peradventure recovered, she was reputed to have consumed the greater part of half a gallon of whisky, if one could accept the confidential reports of some who liked to specialise as nurses overnight when they could safely "broach the admiral."

It was fashionable with many practitioners to prescribe ounce doses of ammonium carbonate in lieu of each alternate dose of whisky, or to substitute it for whisky throughout, but non-teetotal nurses were wont to make the most of cases that were successful under whisky treatment.

The administration of these bulky and repeated drenches to animals almost or entirely unconscious was fraught with the greatest danger on the score of drowning or of drenching pneumonia. Nevertheless,

this was very much ignored, and when the cold or warm pack was in use and the existence of pneumonia became apparent on the second or third day, the blame was often erroneously laid on the nurse for having slept during his vigil and allowed the animal to lie bare of her steaming clothing and thus contract a chill. It is worthy of remark that the coma of the complaint decreased with the onset of pneumonia.

Cold effusions to the poll were commonly applied by fixing cold wet cloths round the horns or a stocking containing wet salt or ice. In lieu of this, blistering agents were often applied to the poll. The enema funnel was used in all cases till purgation began and during prolonged coma the catheter had to be passed repeatedly.

With the return of consciousness, if the patient showed no inclination or failed in an attempt to rise, mustard was applied along the spine. Sometimes acetic acid was used, but seldom any preparation of turpentine, as many owners were prone to attempt the salvage of the carcass if the cow remained too long paralysed. At this point also, medicinal treatment was changed to nerve stimulants and stomachics, given in ale, coffee, or gruel.

In all cases the udder was stripped before turning the animal over, which was done every four or five hours.

At that time the animal's ability to carry its head, and the return of appetite, were no guarantee that she was out of the wood, for there was always the possibility that she had sustained some locomotory lesion during the early period of excitement or of later unconsciousness, the result of awkward falls, abduction of both hind limbs, or mal-position of them when recumbent, etc.

Many expedients were resorted to to get the patient on her legs, provided the carriage of her head, the quality of her pulse, and evidence of restored appetite and digestion warranted them. Many bordered on cruelty, while a few were distinctly cruel, especially when practised by ignorant attendants or owners distracted at the apparent unwillingness of the patient to get up. They included such measures as :—

1. The sudden throwing of a dog at the animal's head with the object of startling her into making an effort. This sometimes succeeded, but often the cow would sullenly defend her position and, perchance, pin down the dog with her horns.
2. Bellowing into the cow's ear, or pouring cold water into the ear, when, in some cases, the animal at once made an effort.
3. Pulling the animal's tail straight back and placing a round stick above and another below the middle third of the tail at right angles to it and grasping the ends firmly with a hand on each side, applying pressure and friction over the vertebræ.

XUM

This was a favourite and often effective plan, which caused such pain to the animal that if she had the ability to get up she made her best effort at once. If repeated, this treatment sadly bruised the tail. A modification of this device consisted in rolling the end of the tail on the ground with pressure under the foot. If the practitioner did this unseen and shouted loudly, his voice was deemed magical if the cow got up.

4. Delivering a sudden compression blow with both knees on the ribs of the recumbent cow, which often resulted in the animal making a successful effort to rise.
5. The application of strong acetic acid to the spine followed by a stroke with the whip when the cow began to fidget under its biting action. Any effort made by the cow to rise was encouraged by shouting and by grasping the root of the tail and helping to raise her up.
6. The placing of a strong sheet under the patient's body by turning her over on it and, when adjusted, for two men, one on either side, by grasping the sheet to endeavour to lift her up while another flicked her with a cane in the hope that she would be made to grip the ground with her feet. The support of an assistant seizing the root of the tail with both hands was invaluable while the cow was making her effort.
7. The use of slings in obstinate cases. If the animal gripped the ground with her feet when raised she was sometimes so much improved through standing an hour or two that she would be able and willing to rise herself on the next asking. Too often, however, the cow would resent this expedient and hang limp with bent limbs until let down to avoid suffocation, but sometimes such an animal would get up, later on, of her own accord, though perhaps knuckling over in one or both hind fetlocks owing to spasm of the flexors. In many hopeful looking cases, in which the appetite had fully returned, rumination was normal and the secretion of milk somewhat restored, the evidence of some traumatic lesion to one or both hind limbs was apparent about the third day, and the animal when raised up could not plant its feet on the ground, or, if it did so, it knuckled over at the fetlocks, or if the foot of the faulty limb slipped outwards, forwards, or backwards, the animal would settle down and further strain the already injured structures.

The commoner lesions were—

(*a*) Swelling and degeneration of the tendon-achilles just above the hock. On occasion we have seen these tendons on both limbs so degenerated that rupture took place.

XUM

(*b*) A deep-seated, progressive and painful swelling in the posterior muscles of the thigh. Both of these lesions were directly due to the insensate animal lying for a prolonged period with the limbs cramped and awkwardly placed below the body, and could be avoided by careful nursing. It is to be remembered, however, that these flexor muscles are commonly involved in clonic spasm more or less marked in milk fever cases at the onset of the complaint causing the cow to paddle stiffly before going down in a heap. Conceivably the structure of the muscles suffer under acute spasm and this may predispose to awkward recumbency, inhibit the desire to rise, and cause, in the risen cow, the occasionally-seen knuckling over of the fetlocks, dropping of the hock level, and indurated painful swelling of the belly of the muscles—a state of matters that did not very quickly pass off.

(*c*) Laceration of the internal muscles of the thigh (causing immediate swelling of the parts and rendering the case utterly hopeless), was a common result of the hind limbs becoming spread-eagled on a slippery stall in the early stages of the disease or when an animal, insufficiently recovered, was forced to her feet prematurely. Occasionally, about the sixth or seventh day of treatment, one would find a recumbent patient greedy of food and well in every respect excepting that one or both thighs would be enormously swollen and painful, the result of lesions (*b*) or (*c*), or a combination of both, rendering the case hopeless. When cut into after death, the tissues were found to be greatly degenerated, dark-coloured, and filled with exudate.

Many old-fashioned practitioners and owners divined the cause of the cow's inability to rise, in the soft, flabby and flexible state of the last six inches of the tail—invariably present in all cases of paralysis, the result, doubtless, of faulty circulation to a part so remote from the heart—and they called the disease "tail-slip" or "worm in the tail." It was their cult to slit the soft structure of the tail at this place, dress it with a mixture of garlic and lard, and apply a bandage. These people could never explain why if this pulpy part of the tail were the whole disease and the seat of it they did not dock it off and so cure the beast, and render it immune for ever to the malady.

The practitioner who could boast 30 per cent. of recoveries with the treatment we have been discussing was lucky beyond the average, and when we consider the trouble and expense which many recovered

animals cost, and that many of them were considerably reduced in value, there is little wonder that instead of sending for the veterinary surgeon when a cow went down some people sent for the butcher. Nor is it matter for surprise that many veterinary surgeons, though they had no clear idea what treatment ought to be substituted for that of purgatives and stimulants, were forced to give it up altogether. Those who did so and prescribed only a few small doses of tincture of aconite, involving no risk to the lungs from drenching, or who relied solely on nursing and the use of enemata, had at once their reward in an increased percentage of recoveries.

But the doom of this first period of treatment by stimulants was settled when that by sedatives came into vogue in 1890.

2.—Treatment by Sedatives—Chloral Hydrate and Potassium Bromide.

In the *Veterinary Record* of July 5th, 1890, Thomas McConnell, of Wigtown, published the beneficent results of his use of these agents, which marked a very distinct advance in the successful treatment of milk fever. From that date onward the disease was decreasingly referred to as " parturient apoplexy."

Prior to this date McConnell had been for several years prescribing large doses of potassium bromide and a few pounds of treacle, with good results, his failures being chiefly attributable to the occurrence of pneumonia and what he called " fibroid degeneration of the muscles of the thighs." The latter was doubtless the lesion we have referred to as the result of injury from malposition and clonic spasm, and which some other practitioners erroneously designated " erysipelas."

Later on he substituted chloral hydrate for half the dose of potassium bromide and had increased success in the speed and number of recoveries.

It would appear that the number of cases of pneumonia supervening decreased with the use of chloral, and believing as we do that practically all such sequelæ were the result of drenching, with bulky medicines, animals that to a great extent had lost the power to swallow safely, the less frequent occurrence of pneumonia was perhaps attributable to the fact that the animals were for a shorter time *non compos mentis* and were thus able to swallow safely the later doses. Many practitioners adopted the use of Reid's stomach pump, or a short improvised probang attached to a funnel for the safe giving of bulky drenches.

The results of the adoption of the sedative treatment were many. Success attended treatment in from 65 to 75 per cent. of cases; recoveries were more rapid; the labour of nursing was greatly curtailed and recovered animals were but little reduced in value and were often giving full milk on the third day.

XUM

Nevertheless, it was still the custom to give large quantities of treacle with each dose, and it must be admitted that cases of pneumonia were not uncommon.

McConnell's recipe of 1890 was :—

℞ Chloral Hydrate ... ... } a.a. ℥iiss.
Potass. Bromide ... ... }
Aqua Ad. ... ... ℥xxv.
M.ft.mistura.

Sig.—Give five wineglassfuls along with 3 lbs. of treacle. In two hours give half the quantity with 1 lb. of treacle, repeating the latter dose every four hours, stopping the medicine as soon as the cow has got up.

His routine after-treatment consisted of giving stimulants, e.g. ammonium carbonate or ether sulph., and applying mustard to the spine.

McConnell's treatment was soon adopted universally, and many contrived successfully to get a sale for milk fever medicines far and near by means of depots.

In some cases the chloral hydrate and potassium bromide were sold as such and referred to as " milk fever crystals " in separate bottles with labels giving full instructions. Others netted a larger profit by putting up the medicine in solution in sets of four 8-oz. bottles (Nos. 1, 2, 3 and 4) with labels giving elaborate instructions in line with McConnell's advice. Later on, chemists followed in the train of these veterinary surgeons and many of them have made large profits by the sale of solutions of chloral hydrate well disguised. Indeed, even now the medicine sold by such chemists for milk fever is in daily use in many stockowners' herds, who excuse the keeping of such quack medicines on the plea that they have a deserved reputation and that practitioners fail to provide them with first-aid and efficient drugs to enable them to put animals immediately under treatment. In the writer's opinion, it is a moot point whether members of the profession should not make an endeavour to meet this and like situations created by owners with a penchant for " trying their hand." Too often the practitioner is roused from slumber to minister to a patient loaded with expensive quack medicines, which he cannot safely follow up through ignorance of their composition, while their vendor struts off with the lion's share of the ungrudged kudos.

Recovery under the chloral treatment usually occurred in from 8 to 24 hours, though in some cases the animal did not get up for two or three days, while in all some treatment with nerve stimulants was necessary before all the functions were fully restored. The

treatment failed in about 25 per cent. of cases, many of them from accidents to limbs or through drenching.

3.—Treatment by Udder Injection.

In 1897 J. Schmidt, of Kolding, in a prize essay on the "Cause and Treatment of Milk Fever," explained his belief that the disease was due to an auto-intoxication, and that the poison takes its origin from the colostrum corpuscles and degenerated old epithelial cells of the udder.

The chief aim of his treatment was to check the formation of colostral milk, and to paralyse any existing poison. The udder was cleansed, disinfected, and then a solution of two drachms of potassium iodide in about two pints of boiled water cooled to 40° C. was injected in equal quantities into each of the four teats, accompanied by massage of the udder. A little air was allowed to enter, which, the author considered, favoured the liberation of free iodine.

The remarkable results published (92 per cent. of recoveries—many of them in a very few hours) encouraged many of us to make trial of the treatment at once, though in most cases the old treatment with chloral was also continued for a time in addition.

The change was amply justified, though it must be admitted that cases of mammitis were not uncommon as sequelæ in the early days. Soon it became the custom to follow the injection of the potassium iodide solution by pumping air into the udder and this materially shortened the course of the attacks. By and by, because some attributed the occurrence of mammitis to the effects of the solution used, dilute solutions of antiseptics such as chinosol, etc., were used without prejudice to the number of recoveries that followed.

Later on a further development took place, fluid injections were entirely displaced, and the udder was inflated with oxygen, but more commonly with air sometimes filtered through cotton wool by means of a special instrument. This is now everyday practice. The udder is filled to repletion, and a tape tied on each teat with the object of preventing escape of the air from the udder, and, if precautions are taken to keep the instrument aseptic, it is the exception for udder trouble to ensue.

When doing duty under the Tuberculosis Order and the Public Health Acts, the writer sometimes sees cases of mammary catarrh and induration in animals that have been treated for milk fever, and of which the attending practitioner has received no notice.

In exceptional cases—usually those treated by an owner—three or four quarters of the gland have been infected, and the cow rendered useless for dairy purposes.

XUM

These results emphasise the need alike for rigid antiseptic precautions in regard to the udder and teat tube of the instrument and a proper inspection of the state of the udder before treatment to detect latent infection in any quarter and avoid the carrying of infection to the other quarters.

Soon after the publication of Schmidt's results, the writer adopted his methods and, thanks to Schmidt, derived considerable emoluments and reputation therefrom, and when he gave up practice in 1910 he was very apprehensive of the evident increase in the number of owners who became possessed of milk fever outfits.

But, thanks to the vulnerability of the udder at the hands of incompetent operators, this tendency on the part of stockowners has not greatly increased, and careful practitioners still draw considerable income from the treatment of milk fever cases.

Without doubt, Schmidt has been the greatest benefactor of modern times to the country practitioner and the owners of milch stock, and we hereby acknowledge our great indebtedness to him. A like tribute is due to McConnell, who first enabled the country practitioner to be worthy of his hire in the treatment of milk fever.

Considerations of space forbid fuller reflections on this subject.

FOOT-AND-MOUTH DISEASE.

Its Nature, Causation and Incidence.

By DR. JUAN E. RICHELET,

Veterinary Representative of the Argentine Ministry of Agriculture in England.

CONSIDERABLE perturbation has recently been caused in the meat trade and ancillary quarters by certain scientific experiments in Strasbourg, the result of which engendered a suspicion that chilled meat and other organic matter produced by the sacrifice of livestock during the period of incubation was capable of transmitting foot-and-mouth disease, or *aftosa* as it is familiarly known in South America.

This dread and mysterious disease has hitherto eluded the efforts of the leading scientists of many nations to discover its origin. It has been known in the United Kingdom since 1839, and reached its highest period of infection in 1923, when pursuant to the fixed policy of the British Government, 250,000 cattle were sacrificed, involving indemnification of the owners to the extent of some £2,500,000.

Investigations are constantly taking place with a view to discovering the various types of virus; and the British Government has been unremitting in its efforts to discover the cause of the periodical out-

breaks of the disease and the manner of its introduction. The Foot-and-Mouth Disease Research Committee, established by the Board of Agriculture and Fisheries, is at the moment engaged in inquiry into the subject, and has just issued a third "Progress Report," which, notwithstanding the valiant and indefatigable efforts of the best scientific minds available for the work, is unable to record any perceptible progress. The problem remains as baffling as ever.

Three forms of the disease have already been registered, and are known as types "A," "B" and "C." The painstaking researches of various European scientists, notably Professors Roux and Carré, have established that animals once infected with one type of virus could not become again infected with the same virus for several months, but that they remained susceptible to infection by a third virus, the second attack being as severe as the first. Professor Lebailly affirms that the virus does not persist on the characteristic ulcers formed on the feet of infected animals. Healthy animals inoculated, either subcutaneously or intermuscularly, with fragments of tissue taken from the ulcered portions of animals formerly affected suffer no ill effects. Professor Lebailly has also established that four days after the appearance of the ulcers, animals have already ceased to be contagious to others with whom they were brought into contact.

Some European authorities believe that only one form of aftosa can be contracted by human beings, thus explaining the negligible number of cases observed. It is also significant that during 1926 and 1927 the total number of cases of suspected human infection did not amount to a dozen all told, notwithstanding the fact that thousands of cases occur daily in Europe—principally, of course, on farms; and as the milk of diseased cows is mixed during the period of incubation with the milk of healthy animals, and is therefore consumed by the entire population, it is inevitable that were the disease contagious there would be thousands of cases of infection of human beings.

Although Great Britain, by reason of her determined policy of slaughtering infected animals and compensating their owners, has made the greatest sacrifices in an effort to free her territory from the scourge of aftosa, other great nations are also doing their part. The French Government maintains a laboratory for the study of animal diseases, which is under the direction of the eminent Professor Vallée. Italy has devoted attention to the subject, and her scientists have contributed much useful information in regard to the virulence of the disease in the blood of infected animals. The United States, although her laws forbid the study of the disease within her territories, periodically send abroad commissions to make investigations, under the charge of eminent bacteriologists. Sweden, preoccupied by

XUM

numerous outbreaks in her territory, instituted intensified sanitary measures. The Swedish experts arrived at the conclusion that infection was transmitted by human beings who carried the disease from one centre to another in various ways. Norway, formerly regarded as the only country immune from aftosa, in 1926 experienced various outbreaks. Indeed, the only countries recognised as free at the present moment are Australia (where aftosa is unknown), New Zealand, Canada, Ireland and the United States.

Chilled Meat.

The fact of meat having been chilled is in itself a guarantee of healthy conditions. In accordance with the laws of meat-producing countries, all cattle intended for export is submitted to three successive inspections during a period of eight days immediately before slaughter. The lactic acid produced after the death of the animal neutralises the action of any virus that might be present. The possibility of the preservation of some degree of virulence in the blood and marrow need not cause concern, inasmuch as all meat for export is first drained of blood in order to enable it to keep better, while the internal bones of slaughtered cattle never enter into contact with livestock, being invariably boiled or incinerated under the orders of the Ministry of Agriculture.

The results of protracted and microscopic investigation during recent years afford little justification for the stigma that has suddenly been attached to chilled meat which has been imported regularly in the United Kingdom for more than 50 years. Foot-and-mouth disease have existed concurrently in South America and the United Kingdom for many years, but it was not until two or three years ago that any credence was given to the theory that meat and cereals were the media of contagion. As a matter of fact, the experiments and research work carried on by the various laboratories during recent years, and the conclusions drawn therefrom, afford no ground whatever for such theories.

The author has had the advantage of discussing the incidence of aftosa with many of the leading scientists engaged in research work. It is noteworthy that they almost unanimously disagree with the fears of British farmers lest the virus of aftosa might be transmitted by frozen meat. They pointed out that if preventive measures were inaugurated in regard to frozen meat they would also logically have to be extended to cover grain, straw, wool, hides and all other animal products. The transit of passengers between infected and non-infected countries would have to be interrupted, and commerce in general—particularly that of Great Britain—would necessarily be completely paralysed.

XUM

Although it is certain that the virus of aftosa remains virulent for a long period in bone-marrow, it is equally certain that numerous other substances exist—although as yet unknown to bacteriologists—that preserve the virus for a far longer period. The recent international conference on the subject in Paris proved clearly the absolute necessity for a scientific basis regarding the contagion and evolution of aftosa, and that no method is efficacious until more accurate and complete knowledge shall have been acquired. Indeed, the interim report of the British Committee to which reference has previously been made observes that the making of experiments evenly roughly quantitive, is " so difficult and tedious as to dismay all but those possessed of a stout heart and much patience."

New Methods of Attacking the Problem.

Professor Vallée, the eminent French bacteriologist, informed the author that both he and Professor Roux, of the Pasteur Institute, have racked their brains with regard to experiments concerning aftosa, in connection with which they have employed every means offered by physics and chemistry. Professor Vallée believes that studies and experiments should be carried on simultaneously in all countries afflicted by foot-and-mouth disease, in order to obviate the risk of narrowing down study to one particular type. He feels that the studies of the British Committee need to be confirmed and amplified in the various countries, especially in regard to meat ; in order, for instance, to establish clearly the effects of the voyage from South America to Europe upon frozen meat under normal conditions of transport, utilising carcasses of animals sacrificed during the incubation period of the disease. Experiments should be carried out both in the country of origin of the meat and in the country of destination on its arrival there. Such experiments, according to Professor Vallée, might be based on the following principles :—

Diseased meat, with its wrappings, should be hung in refrigerated chambers and later placed in contact with cattle that had never suffered from the malady. Persons whose hands and clothing had been infected by handling diseased meat should be placed in contact with cattle susceptible of contagion. Susceptible animals should be inoculated with the marrow and blood of virulent meat. These experiments, of course, would take place in the country of origin.

The experiments to be carried out in the country of destination should include the transport of a small consignment of chilled and frozen quarters of beef and offals in a specially isolated chamber aboard ship to a French port, leaving the corresponding experiments in the charge of Professor Vallée.

XUM

It will be seen from the foregoing that it is worse than useless to dogmatise upon a subject in regard to which the most eminent scientists of the world, after years of intensive study and research, are as yet virtually without information. The better course would seem to be to work for the closest possible international co-operation in the hope of eventually eradicating a scourge whose persistence imposes upon agriculturists in afflicted countries incalculable harm from every point of view.

POULTRY DISEASES.

By JOHN P. RICE, B.Sc., M.R.C.V.S.,
Head of Animal Diseases Division, Ministry of Agriculture, Northern Ireland.

THE Third World's Poultry Congress held at Ottawa last year was the largest international gathering ever assembled to study a particular branch of agriculture. It was attended by 2,599 delegates representing 42 countries, while the Congress exhibition was visited by 150,000 people. The Congress was opened by His Excellency the Governor-General of Canada and the closing meeting was addressed by the Premier of Great Britain, on whose invitation the Congress will be held in London in the year 1930.

The Congress was thus an important one which commanded the attention of the whole civilised world. It was of special interest to veterinarians because 40 papers were presented on poultry diseases, the largest section of the Congress. The contribution of the British veterinary profession was one short paper, read by title, which dealt only with broad aspects.

Some explanation seems necessary for the small part played by veterinarians in this country in avian practice and research. Perhaps it is that the poultry industry is unimportant in the British Isles or that serious losses are not sustained from disease or that it is not economical to apply veterinary measures to poultry or that the diseases cannot be controlled. Or, again, it may be that we as a profession are indifferent to any problems which present themselves, and that our lack of interest is responsible for the poor recognition given to us by those in a position to promote research work.

Let us examine each of these possibilities.

It was estimated by a competent authority that in England and Wales alone the monetary value of the output of eggs and poultry in the year 1924-25 was £23,779,000, or 48 per cent. greater than that of the wheat crop. Poultry-keeping is then one of the major branches of

agriculture and is, in fact, the only one which has shown a consistent profit throughout the period of post-war depression.

The annual reports of the chief veterinary officer of the Ministry of Agriculture and Fisheries for the years 1924 and 1925 show that, excluding scheduled diseases, the numbers of specimens voluntarily submitted for laboratory examination were 2,745 and 2,690, respectively, of which 2,698 and 2,622 represented diseases of poultry and small livestock. The experience of several other veterinary laboratories in the British Isles is also that poultry examinations constitute a large part of the routine work. These figures may be interpreted as meaning either that avian diseases are commoner than those of other animals or that poultry-keepers are more anxious than other owners of livestock to seek professional advice, at least that coming from a laboratory. It is of little moment whether one or both conclusions are drawn. The existence of a distinct disease problem is established.

Those who are in touch with the poultry industry can have only one opinion regarding disease. There is no escape from the conclusion that it is the biggest obstacle to success in this branch of agriculture. The subject is always a leading topic in the poultry press, and there is a continual appeal for assistance to combat the heavy losses which are experienced. It is not too much to say that domesticated birds suffer more from disease than do other livestock. It is always a difficult matter to express disease losses in terms of cash, but we can safely estimate that one disease alone, bacillary white diarrhœa, prevents potential profits bordering on half-a-million pounds annually.

The third possibility that poultry are not worth treating has become almost a belief with most veterinarians. Perhaps this is because we take too narrow a view of the part we should play. We are so occupied with applying curative measures that we forget the major role of preventing disease. While it may well be argued that the individual sick bird does not repay veterinary treatment, there can be no doubt that the application of mass preventive methods is an economical proposition, both from the farmer's and our own points of view.

On the average general farm 33 fowls yield a profit equal to that given by one cow. There is thus ample financial justification for efficient prophylactic measures even where poultry are kept only as a side-line. If we turn to poultry farms proper, the case for our intervention is much stronger. Here the birds are more valuable than barn-door fowl and the losses are heavier. Any interference with the year's programme of work, especially during the breeding season, may wipe out all the profits. One has only to visit counties like Lancashire and Yorkshire to realise the part which disease has played in bringing poultry farmers to the verge of bankruptcy. And the pity

of it all is that these men have expended and are expending large sums of money on quack advice and remedies while we look on indifferent to our duty as custodians of the health of the lower animals. The poultry farmer can and will pay for advice of value.

We have now to consider the possibility that avian diseases cannot be controlled by veterinary measures. Firstly, let us realise that, even if we know little about poultry, we are at least trained in the basic methods of preventing disease. Measures such as isolation and disinfection seem so ordinary and obvious to us that we are inclined to credit farmers with similar knowledge whereas, in fact, they are largely ignorant in these matters. If we do nothing more than acquaint them with the general principles of prophylaxis, then it would be no mean achievement.

But there is other and more specific advice we can offer the farmer.

Bacillary white diarrhœa can be prevented by eliminating the birds which lay diseased eggs. Such " carriers " can be recognised by means of the agglutination test.

Coccidiosis can be controlled by the use of catechu and by the cleaning of the houses every second day.

Gapes would decrease if chicks were kept apart from turkeys. A simple treatment consists in the use of sodium salicylate.

Blackhead would cease to be the scourge of the turkey world if chicks were hatched and reared under ordinary hens or artificially. Catechu is again a useful remedial drug.

Avian diphtheria would no longer be dreaded if an effective vaccine were employed.

Tuberculosis would become unimportant if farmers culled birds after the second laying season. Tubercle-free flocks can be built up on the basis of the intradermal test.

Fowl typhoid can be controlled by vaccination, there being a special need in Wales where the disease is enzootic.

Leg weakness in chickens can often be remedied and prevented by using glazing material which can be penetrated by ultra-violet rays.

Internal parasites can be treated by the usual anthelmintics, including tobacco powder.

External parasites can be killed by insecticides, including sodium fluoride for lice. Treatment of the house is also indicated for red mites and fleas.

These diseases cover all the most important causes of loss in the British Isles. While the discussion of preventive measures has been necessarily brief, sufficient indication has been given that there are methods of control, or, at least, the means of lessening the ravages of avian diseases.

XUM

Our examination of the position has so far shown that there is a distinct case for our intervention. The question now remains why we stand aloof.

The view that poultry farmers cannot and will not pay for our services has been rejected. The fault must then surely lie with ourselves. Let us ask ourselves what veterinary education has done to equip us to meet this situation or to foster an interest in poultry problems. The answer must be that our courses of instruction take little account of domesticated birds. We leave our colleges largely ignorant of the magnitude of the poultry industry and its great losses. We bring away with us the impression that the amount of stress laid on avian matters by our teachers is an index of their importance. We are thus handicapped from the start of our professional career.

Our duty is to overcome this handicap. It will be only by individual effort that our profession can occupy its rightful place in poultry husbandry. It is not difficult to learn the rudiments of the business because daily our practice brings us to farms where fowls are kept. There we can gain the general knowledge which should ultimately inspire the confidence of the whole-time poultry-keeper. Perhaps at first we may feel a little helpless when our advice is sought, but we should remember that several veterinary laboratories examine and furnish advisory reports on specimens. One of the several textbooks on poultry diseases would also be of valuable assistance.

While the preventive measures available are sufficiently good to justify their application, they cannot be regarded as entirely satisfactory. Much research work must be undertaken before an ideal state of affairs is reached. To mention only two diseases, we want a standard method of testing for bacillary white diarrhœa and a more effective vaccine against avian diphtheria. These and many other problems await a solution, but we are not interested. In our colleges, in our practices, in the meetings of our societies, we ignore poultry, and the consequence is that the authorities who can promote avian research ignore us in turn. We cannot blame them because our inactivity is reflected in their attitude. The past should have taught us an unforgettable lesson of lost chances. Nutrition, clean milk and other essentially veterinary subjects have largely passed from our profession into the hands of those who are more progressive—who can read the signs of the times and act. The field of avian diseases has already been invaded by others, and our care should be that this peaceful penetration does not end in annexation and our exclusion.

Let us not indulge in self-pity and lament the passing of the horse. Let us rather turn to the new fields of veterinary work which are opening up in this country. Let us show both as individuals and as a

profession that we are eager to tackle the problem of avian diseases. Then will the poultry farmers flock to support us in our practices and in our demands for research work in keeping with the importance of a great industry.

The Fourth World's Poultry Congress will meet in London in the year 1930 on the invitation of our Premier. There will be a part for us to play in that congress. An opportunity will be afforded of impressing the Government with the value of our profession. Let us prepare ourselves for that important occasion. Let us prepare to help an industry struggling against disease.

THE HUMANE KILLING OF PIGS BY ELECTRICITY.

By DR. MAX MÜLLER,

Professor for the Hygiene of Meat in the University of Munich.

UP to now the slaughtering of pigs has not been in accordance with the demands of humanity. I recall the statements of Paddison, Wood, Anthony, Mayall, and Ross Grant, in the special number of the Veterinary Journal of September, 1927. There the reason is given why, as a rule, pigs are bled without any preliminary stunning. Many bacon-curers are of the opinion that pigs which have been stunned prior to bleeding are inferior to those bled without any preliminary stunning. Many practical men in the bacon-curing trade are very definitely opposed to mechanical stunning. They believe that the flesh of a large number of pigs, stunned in this manner, cannot be preserved as bacon or in other forms.

The shortcomings of mechanical killing are well known to me in my position as a Veterinarian and Chief of the Sanitary Department of the Public Slaughter-house in Munich. Here these disadvantages of the mechanical killing had to be accepted for want of a better procedure, in opposition to England, where the mechanical killing is mostly rejected in consequence of the supposed or real shortcomings of this procedure.

It is true that at times bloody splashes are found quite frequently in the muscles after shooting, and the bodies are sometimes not well bled owing to the stunning which precedes the shooting. The bleeding and the stunning of big pigs has its difficulties till they have been deprived of their own will and are completely stunned. The lesions caused by shooting and by a second blow of the poleaxe also cause economical disadvantages. The bloody extravasations and destruction of the head make the affected parts unfit for consumption. The driving in of the shooting bolt produces a mutilation, and a hæmorrhage, of the brain, and the putrefaction of the head will start correspondingly sooner.

XUM

All shortcomings mentioned here are avoided in the new process of stunning by electricity, which has been worked out for the slaughtering of pigs by Engineer A. Weinberger and myself.

By this procedure the animals are stunned instantly and the bleeding is excellent; muscle hæmorrhages do not occur and the process itself does not present the least danger for the slaughterer. The animals stunned by electricity can be touched without any danger. If the animals are not slaughtered immediately after the stunning they recover slowly and become quite alive again after three or four minutes. If the stunned animals are stuck, the animals lying unattached bleed copiously and lose all their blood in a short time. The electrical stunning passes over into the anæmic unconsciousness, which is followed by the physiological death owing to paralysis of the heart and suffocation.

In stunning pigs by electricity they are put into the pig trap and are touched on the front of the head with a rod, which serves as an electrode. The stunning takes place instantly. After touching the pigs with the rod for five to eight seconds, they are turned out of the trap by tilting the latter, and bled without regaining consciousness. The trap itself is ready for the next animal. The electrical stunning process has the additional advantage over the shooting that it takes a much shorter time. The current consumption is very low, since an intermittent direct current of 30-50 volts is sufficient.

The electrical stunning process for pigs has been also tested by us in connection with stunning experiments on cattle. Here, too, the electrical process has its advantages in instantly rendering the animals senseless and depriving them of volition, whereby a specially good bleeding can be achieved in slaughtering or butchering.

In Germany, and in all countries which are interested in the humane killing of pigs, the electrical stunning process has aroused great interest. As regards pigs, the electrical stunning process is even now far superior to all other processes.

The process is also destined to play a great part in veterinary practice, everywhere where it is the question of gaining control over the animals, so for the purposes of throwing and laying down cattle, for hoof operations, castrations, for performing operations on wild or violent animals, and, finally, from the humane aspect as a medium for narcotising, putting to sleep, and quietening. The process of narcotising by electricity opens a wide vista; the apparatus designed by us, which permits a continual regulation and dosage of the electrical current free from shock, will enable science to gain important and very interesting insight into the psycho-mechanics of the human and animal brain. The electrical stunning of animals offers the basis from which progress in this direction can be made.

XUM

OBSERVATIONS ON CALCIUM DEFICIENCY AS A CAUSE OF CERTAIN DISEASES OF ANIMALS AND MAN.*

By C. E. CORLETTE, M.D., Ch.M., D.P.H.,
Senior Surgeon to the Sydney Hospital; Lecturer in Clinical Surgery, University of Sydney.

(*Continued.*)

The "surprise effect" is not a fanciful idea invented without physiological warrant. Surprise effects occur in all directions when untrained tissues are called upon to meet sudden great demands.

I am, of course, aware of the physico-chemical view of bone change, addition being regarded as a deposition from solution, and subtraction as a washing out process, a going into solution. Such a conception does not necessarily exclude the operation of "surprise effects."

The extreme and absolutely fundamental importance of the rôle of calcium and phosphorus is hardly realised. Calcium and phosphorus are described by medical writers mainly as the "bone-forming materials," and the general idea seems to be that these elements find their chief use in the building up of the bones, and when that is finished they remain static. Unquestionably they find part of their function in the formation of the skeleton. But to leave it at that gives a wholly inadequate notion of the truth. Phosphorus plays some important part in the nervous system. Again, the profound importance of a correct balance between sodium and calcium ions for the preservation of life and function in protoplasm has been demonstrated convincingly, and many times, by Jaques Loeb and others during the past 25 years. Or perhaps I should rather say, the importance of preserving the ratio $\frac{Na + K}{Ca + Mg}$ at the correct balance. Physical and physiological equilibrium rests at the point where the ratio of the monovalent to the divalent cations equals 1 : 50. The influence of variations of balance of antagonistic electrolytes on phase relations governing permeability of living cells has been discussed in a very striking paper by G. H. A. Clowes.[26] Clowes's experiments seem to show calcium as the king-pin of cell nutrition.

And lastly, there is the abundant and convincing evidence of clinical and laboratory studies of nutrition.

As a matter of fact, the most important part of the functions of calcium and of phosphorus is within the complex of biological processes

* Reprinted from "*The Medical Journal of Australia.*" Feb. 18/28.

that makes up the life of the body and its constituent cells. The static function in the bones takes second place.

If I am viewing the position aright, it seems that in osteomalacia and in rickets the osteoporosis is protective, and not primarily an atrophic process, and that the less important is sacrificed to maintain the more important. Decalcification or dephosphorisation of the important vital tissues would mean rapid death. But decalcification and dephosphorisation of the bones mean weakness, not death. There are other conditions of disease and disuse in which osteoporosis occurs, but we are not discussing that here. But in the osteoporotic changes of osteomalacia and rickets, let me emphasise the view that we behold there a protective process. In rickets, the pathological changes at the growth zone discover an attempt to maintain vital function under difficulties, and from that point of view they are not part of the protective process, but of the protected.

In young animals, a slackening of the growth impulse would slacken the intensity of the bone-forming process at all the growing points. This would give opportunity for better functioning of other vital metabolic processes to which calcium and phosphorus are essential. Thus a slackening of growth helps to solve the difficulties created by short supplies. We can also see that in the absence of growth the conventionally typical pathological appearances held to signify rickets could not appear. The adult would then be held to have osteomalacia, or some non-committal paraphrase meaning the same thing would be used. In a rickety child or animal, a slackening of the pace of growth would obviously tend towards recovery, or "healing."

In starvation, rickets is said to improve. During starvation there is a consumption of depôt fat, and if any fat-soluble vitamin (*A*, *D* or *E*) is present therein, it would be liberated for use perhaps quicker than under other circumstances (Melanby).[2] Also, there is an autolysis and partial combustion of muscle,—it amounts to feeding with muscle proteins. McCollum[27] sees in this an opportunity for liberation of mineral constituents for supply of body needs during shortage. It would, however, liberate far more phosphorus than calcium, and the ratio would be incorrect for bone formation, though there would be some small quantity of calcium available. I would add that in starvation the specific dynamic action of the food would disappear, lowering the general metabolism very considerably, and, therefore, presumably lessening the demand for some of the calcium and phosphorus. I do not, however, think that this would amount to much.

But in starvation there is another circumstance not hitherto taken

into account. The formation of fæces ceases. The stimulation of the intestinal canal is reduced. Its local metabolic changes are materially slowed down, and the denudative process involved in desquamation of epithelium and other material is stopped. This would reduce the output of calcium phosphate very materially, and it would also reduce the output of fæcal fat and lipoid. I showed in 1900[28] that a considerable amount of fat and lipoid is excreted into excluded loops of dog's intestine. Giving the mean results, I found the ether-soluble material to constitute 31·2 per cent. of the total dry weights. Of this, 23·5 per cent. consisted of fats and soaps, and 7·7 per cent. of lipoid, recorded as "cholesterin," as was then usual. The mean ash was 14·34 per cent. I found that calcium phosphate was excreted as bundles of crystals within a desquamating cell, the cell outline being still distinctly discernible. It is scarcely possible to doubt that this is a channel of excretion for the fat-soluble vitamins, in the same way as is the milk of lactating animals.

In cases of experimental rickets, administration of the anti-rhachitic fat-soluble vitamin causes an improvement in the growth zone, so that the conventional signs of rickets disappear. Mellanby[2] noticed that though the "rickets" healed, osteoporosis remained, or might even increase. As I interpret these facts, they show that the "bank" is working efficiently, and issuing currency promptly and equal to requirements, whether supplies are coming in from the alimentary canal or not. It seems to me that this hypothesis gives the most satisfactory explanation for the continued, or even increased, osteoporosis, while the "rickets" heals,—the important biological function of growth is protected by the abstraction of calcium phosphate from the formed bone.

These rarefied bones may bend or break, and that is a common tendency in later childhood. Some of these cases seem to be called late rickets; others appear to be called osteomalacia of childhood.

I shall now put forward a few observations chosen from many more that I have in my note-books. These all seem to have some connection with questions raised in the course of discussion. I have also records of some interesting experimental work carried out with the aid of farming friends, experiments very successful in practical results, but in some respects very difficult to interpret. There will not be space for this.

Chalmers Watson's Experiments on Fowls.

Chalmers Watson's experiments on fowls[29] were part of a research intended to discover the relation of meat feeding to gout, and belong to a period before it was known that there were many, or any deficiency

diseases other than scurvy. They lasted from March, 1900, to July, 1901.

He fed eight fowls on raw lean meat and water, sand and small grit being supplied from time to time. For the first six months, seven of the fowls were kept in the country in a fowl-run by the side of a wall, the floor being natural soil. The eighth was kept in a cage in the laboratory. They took the meat well, and throve for a few weeks, but then showed lameness. Later they took to resting on the ground in a sitting position. The feathers became disarranged and began to come out. About the same time they showed a marked tendency to pick the lime off the walls. At the end of six months, two were returned to the yard in apparent health. Two had died of acute nervous derangement at the fourth and seventh month, respectively. They went off their food, showed symptoms of paralysis and defective co-ordination, rapidly became unconscious, and died. Number 3 was killed in the fourteenth month on account of a third attack of paralysis. A photograph of the appearance in a paralytic attack is given in Chalmers Watson's reprints. It is remarkably like Chamberlain, Bloombergh, and Kilbourne's [30] photographs of *polyneuritis gallinarum* induced by feeding polished rice. Number 4 steadily gained weight, but at the end of the fourteenth month it developed symptoms very similar to strychnine poisoning—opisthotonus, spasms, *et cetera*—but not aggravated by handling. *Post-mortem*, it showed signs of tuberculosis. Microscopical examination of the spinal cord failed to reveal changes. The bone marrow was unduly dark. Number 5 manifested at the thirteenth month symptoms of acute paralysis, most pronounced on one side. The general nutrition was good. Number 6 showed poor nutrition, and became paretic. In walking, it raised the right leg higher and put it down more sharply (spasticity ?). The *post-mortem* examination of Number 3 and Number 6 showed striking changes in the bony system. The femurs were curved. The long bones were thickened and irregular on their surface. The marrow was replaced by what seemed to be osteoid tissue. Chemically, the proportion of organic to mineral matter was greatly increased. The bone marrow in Number 4 and Number 5 was dark in colour.

There is other important matter recorded, but there is no room here to discuss it. Some very good figures accompany the text, at least in the reprints. The best place to study Chalmers Watson's papers is in a collection of reprints appended to his book, "Food and Feeding in Health and Disease," Second Edition, 1913, published by Oliver and Boyd, Edinburgh and London.

Discussion.

Flesh is well known to be remarkably low in its calcium content, though relatively high in phosphorus. Lean meat, such as was given to these fowls, would be very deficient in the fat-soluble vitamins. It is true also that muscle is not rich in vitamin *B* when compared with other sources, but it is able to prevent polyneuritis in birds fed on polished rice. Vedder and Clark[31] found ten grammes daily partially protective for fowls. E. A. Cooper[32] found twenty grammes

daily adequate for protection in pigeons weighing approximately three hundred and fifty grammes. As against this, Chalmers Watson's fowls consumed over three-quarters of a pound, or three hundred and forty grammes daily. But nevertheless, they became paralysed. Note, too, that general nutrition, from the calorie point of view, seems to have been good, one excepted. This is the direct opposite of what is seen in vitamin *B* deficiency.

As regards the spastic gait developed by Number 6, I would like to refer to Chamberlain, Bloombergh, and Kilbourne's[30] decorticated rice experiments. Out of their many birds, two, Numbers 5 and 7, did not refuse food, lose weight, and die in a short time of polyneuritis, like the rest. These two fowls ate well and preserved their condition. Number 5, at about ninety days, developed a spastic gait like that of Chalmer's Watson's bird, and was chloroformed on the one hundred and fourteenth day. Number 7 did not show spasticity, but was found dead after three months. The experimenters remarked that this instance of spasticity stood alone in their experience and in the recorded literature of similar experiments. I suggest that it was an instance of subtetanic spasticity induced by calcium deficiency, and that if the birds had lived longer they would have become paralysed from that cause, independently of any deficiency of " antineuritic " vitamin.

I might say here that the high-stepping spasticity shown by each of these birds, the meat-fed and the decorticated rice-fed, is also the characteristic symptom in the enzootic stringhalt of horses, to be referred to later.

It was a consideration of these observations recorded by Chalmers Watson that first induced in me, about six years ago, a suspicion that paralysis and other derangements of nerve function might be induced by a nutritional deficiency unrelated to lack of the so-called " antineuritic " vitamin. I suspected that it might be an ultimate result of deficiency of calcium and/or phosphorus in the dietary, or of a deficiency of the fat-soluble factor which controls calcium metabolism. I think it likely, however, that other deficiencies can affect the nervous system in a similar way.

In plain words, these lime-eating, and then paralysed, but not emaciated fowls, presented a condition homologous with the bone-chewing, and then paralysed cattle of South Africa. They developed, if one may call it so, an avian *lamziekte*. The farmer's fattest cattle may go down with acute *lamziekte*.

(For References see pages 243-244.)

(To be continued.)

Clinical Articles

The Intravenous Administration of Oil of Chenopodium to Horses.

By MAJOR A. A. PRYER, D.S.O., R.A.V.C.,
Instructor and Bacteriologist, Royal Army Veterinary School, Aldershot.

Introduction.

THE findings of Fernan-Nunez, recorded briefly on page 979, *Tropical Diseases Bulletin*, December, 1927, suggested further investigation of the intravenous administration of oil of chenopodium to horses.

Enquiry was instituted with a view to obtaining information on the following points :—

(*a*) Whether oil of chenopodium could be given conveniently in this manner.

(*b*) If so, the maximum dose that could be employed safely.

(*c*) The anthelminthic efficiency of the drug given intravenously compared with its proved efficiency when administered per orem.

It was hoped that if oil of chenopodium could be shown to be a reliable anthelminthic, when administered intravenously, the undermentioned advantages would result :—

(*a*) A financial saving in virtue of the smaller dose which it would be necessary to employ. This is a serious consideration when using an expensive agent on a large number of animals.

(*b*) Definite anthelminthic action on larvæ encysted in the bowel wall or blood vessels, which appear to remain untouched by the oral administration of the drug.

(*c*) Abolition of the prolonged period of fasting insisted upon commonly, before giving the drug by the mouth.

Technique and Observations.

Three horses, a brown mare, a chestnut mare and a chestnut gelding, of the cavalry type were selected as subjects. All appeared in satisfactory condition, but examination of the fæces, by the sugar flotation method, revealed the presence of ova of Strongylidæ.

SUBJECT NO. 1—BROWN MARE.—On 16–12–27, ova of strongylidæ were detected in the fæces to the number of 50 per field. On the same date and without any preparation she received 5 c.c. of undiluted oil of chenopodium intravenously.

XUM

No untoward sequelæ resulted. Subsequent examination of the fæces revealed the following counts :—

17–12–27	...	...	...	...	70	ova of strongylidæ	per	field.
18–12–27	(8 a.m.)	...	...	...	14	,,	,,	,,
18–12–27	(noon)	...	...	...	100	,,	,,	,,
20–12–27	...	...	...	...	12	,,	,,	,,
21–12–27	...	...	...	...	12	,,	,,	,,
3–1–28	...	...	...	...	1	,,	,,	,,
5–1–28	...	...	...	...	3	,,	,,	,,
6–1–28	...	...	...	...	15	,,	,,	,,

On the 6–1–28 a further 7½ c.c. of oil of chenopodium were given intravenously. Again no ill results were observed. Continued examination of the fæces showed :—

7–1–28	...	...	...	...	22	ova of strongylidæ	per	field.
8–1–28	...	...	...	...	90	,,	,,	,,
9–1–28	...	...	...	...	25	,,	,,	,,
10–1–28	...	...	...	...	150	,,	,,	,,
11–1–28	...	...	...	...	150	,,	,,	,,
12–1–28	...	...	...	...	120	,,	,,	,,
13–1–28	...	...	...	...	54	,,	,,	,,
15–1–28	...	...	...	...	16	,,	,,	,,
16–1–28	...	...	...	...	60	,,	,,	,,
17–1–28	...	...	...	...	36	,,	,,	,,
18–1–28	...	...	...	...	62	,,	,,	,,
19–1–28	...	...	...	...	6	,,	,,	,,
20–1–28	...	...	...	...	5	,,	,,	,,
21–1–28	...	...	...	...	5	,,	,,	,,
22–1–28	...	...	...	...	13	,,	,,	,,
23–1–28	...	...	...	...	5	,,	,,	,,
24–1–28	...	...	...	...	5	,,	,,	,,
25–1–28	...	...	...	...	7	,,	,,	,,
26–1–28	...	...	...	...	2	,,	,,	,,
27–1–28	...	...	...	...	11	,,	,,	,,

Counts were discontinued after 27–1–28 and on 31–1–28 the subject was destroyed. *Post-mortem* examination revealed 34 *Ascaris equi*, all located anterior to the ileo-cæcal valve and 47 nematodes which appeared to be *Strongyli vulgaris*. The majority were active. No naked-eye appearances of trichonema or triodontophorous infections were detected.

The anterior mesenteric artery and its branches were normal.

SUBJECT No. 2—CHESTNUT MARE.—One hundred and ten ova of

strongylidæ per field were counted on 16–1–28, but between 20–1–28 and 27–1–28 the count dropped, without treatment to a daily average of 20 per field with a maximum of 39 and a minimum of seven.

On 28–1–28 the count rose suddenly to 109 per field and 10 c.c. of oil of chenopodium were given intravenously. Twenty seconds later violent excitement resulted and the following symptoms were observed :—

Eyeballs prominent and rolling, ears moved rapidly, animal kicked, struck wildly with the forelegs and fell to the floor of the stall ; it rose again immediately and, breaking away from the attendant, escaped from the stable in a state of delirium, but was captured within two minutes.

The delirium passed off rapidly, but for the next half hour signs of nausea, dull colic and subdued excitement were exhibited. The bowels were evacuated five times in twelve minutes, the fæces becoming progressively softer.

The writer has seen numerous cases of faintness and temporary collapse following intravenous medication, but never previously the train of symptoms described above.

All the symptoms subsided slowly and at the expiration of one and a half hours the animal appeared normal.

Subsequent examination of the fæces revealed :—

29–1–28	...	...	...	...	29	ova of	strongylidæ	per field.
30–1–28	...	...	...	...	65	,,	,,	,,
31–1–28	...	...	...	...	150	,,	,,	,,
1–2–28	...	...	...	...	50	,,	,,	,,
2–2–28	...	...	...	...	87	,,	,,	,,
3–2–28	...	...	...	...	4	,,	,,	,,
4–2–28	...	...	...	...	44	,,	,,	,,
5–2–28	...	...	...	...	16	,,	,,	,,
6–2–28	...	...	...	...	13	,,	,,	,,

SUBJECT NO. 3—CHESTNUT GELDING.—Twenty-five ova of strongylidæ per field were present on 16–1–28. Between 20–1–28 and 27–1–28 the average daily count was eight per field with a maximum of 15 and a minimum of one.

On 28–1–28 the count stood at one per field and $7\frac{1}{2}$ c.c. of oil of chenopodium were given intravenously. Very slight transient restlessness, accompanied by two rapid defæcations followed, but vanished after five minutes. Otherwise no local or general disturbance occurred.

Subsequent examinations of fæces revealed :—

29–1–28	...	...	...	...	16 ova of strongylidæ per field.			
30–1–28	...	...	...	...	1	,,	,,	,,
31–1–28	...	...	...	...	nil	,,	,,	,,
1–2–28	...	...	...	...	2	,,	,,	,,
2–2–28	...	...	...	...	1	,,	,,	,,
3–2–28	...	...	...	...	1	,,	,,	,,
4–2–28	...	...	...	...	1	,,	,,	,,
5–2–28	...	...	...	...	3	,,	,,	,,
6–2–28	...	...	...	...	2	,,	,,	,,

Summary and Conclusion.

(*a*) Undiluted oil of chenopodium may be introduced into the jugular veins of horses without untoward sequelæ.

(*b*) A dose of 5 c.c. in one case and $7\frac{1}{2}$ c.c. in another failed to produce any constitutional disturbance when given to horses of approximately 900 lbs. body weight.

In the third case the administration of $7\frac{1}{2}$ c.c. to an animal of the same body weight produced transient restlessness.

In a fourth case the administration of 10 c.c. evoked delirium.

(*c*) Judged by the following facts, the anthelminthic value of oil of chenopodium when administered intravenously to horses appears low if not actually negative.

Ninety horses showing ova of strongylidæ in their fæces, to the average number of 16 per field, but with a maximum of 40 and a minimum of two per field, were subjected to treatment by oil of chenopodium administered, in conjunction with laxatives, by the œsophageal tube. In every case re-examination of the fæces after the cessation of purging showed a negative count, although in a number of the patients the count reappeared at a later date.

One infers from this that oil of chenopodium given by the mouth is 100 per cent. efficient in clearing helminths from the intestines. Its action on encysted larvæ is another matter.

In the three animals which are the subject of this report and to which oil of chenopodium was administered intravenously, a negative count resulted in one case only and then lasted but for a single day. In Subjects Nos. 1 and 2 increased egg counts occurred at varying intervals between one and seven days after they had received the chenopodium, but the results were too indefinite to attribute them to the action of the drug. In any case the abundance of parasites recovered on *post-mortem* examination of Subject No. 1 supports the inference of low anthelminthic value when administered intravenously.

The value of the daily egg counts of the fæces as a standard by

which to judge anthelminthic efficiency is open to objection, but the time and labour necessary for searching fæces for the macroscopic forms of the parasites was not forthcoming. In any event the method sufficed to show the very different results obtained after the respective use of the oral and intravenous channels of administration.

The wide daily fluctuations in the egg content of Subject Nos. 1 and 2 before they received treatment, varying as they did from seven to 110 per field in the one case and from one to 25 per field in the other, indicate that any attempt to reconcile the egg count to the intensity of the infestation must be fallacious. Stevenson (*Veterinary Record*, Vol. 36, 1924, p. 520) suggests that horses in a debilitated condition exhibit with some degree of uniformity a higher count than those in good condition. The variation in the daily counts of individual animals, together with the fact that horses in good condition show frequently intermittent if not constant counts of 30 or more to the field, renders it difficult to formulate any standard of this description which may be accepted as a satisfactory basis for diagnosis and treatment.

Author's Note.

Daily examination of the fæces, together with all treatment, was discontinued in the case of Subjects Nos. 2 and 3 on 6–2–28. A random examination, however, made on 29–3–28 showed counts of 10 per field in the case of the chestnut mare and 2·4 per field in the case of the gelding.

The mare is the better of the two in general condition.

Intussusception of the Small Bowel.

By S. DE M. WOODWARD, M.R.C.V.S.,
Birmingham.

DATE.—May 13th, 1926.

SUBJECT.—Brown cob, mare, seven years old, the property of Birmingham Co-operative Dairy. Brought into hospital from one of the depots with acute colic. Dose of chloral hydrate administered without effect. Hypodermic injections of morphia and atropine gave no relief, but pain increased, so much so, that it was impossible in later stages to get near the mare with safety to administer any draught or hypodermic injection. She rolled over from side to side with extraordinary quickness, was up and down, sweating profusely. In fact, I have never seen an animal in such acute pain. She died during the night.

Post-mortem examination revealed intussusception of the small bowel. The actual invagination measured 6 feet and the bowel when

extended, 18 feet. Cases of invagination of the small bowel in my experience are usually 1 to 2 feet. The foreman of the slaughter house said he had never seen a similar case during 20 years in the yard.

An Interesting Cryptorchid.

By MAJOR WILLIAM ASCOTT, O.B.E., T.D., M.R.C.V.S.,
Bideford.

In operating upon Cryptorchids one frequently gets cases of special interest, and some which are worth reporting as a guide to others, and particularly to those who are just commencing to do this special operation.

A few weeks ago I had a four-year-old blood colt in which, when under chloroform, I could definitely locate the epididymus in the inguinal canal, but do as I would, I could not withdraw the whole of the organ through the ring. My method of procedure, which eventually proved successful, was to remove this with the ecraseur, and then to break through the abdominal wall above the ring and enter the abdomen after the body of the testicle. This was found quite readily with two fingers, as it was about the size of a large orange—cystic and hard. Unfortunately I was unable to examine its structure as it was stolen by a sheep dog, who had been anxiously sitting behind me, and got hold of it whilst I was completing the operation without my having observed the fact that he was waiting for his dinner.

Globidium Smithi in the Mucosa of the Small Intestine of a Bull.

By A. W. NOEL PILLERS.

Early in December, 1927, Mr. R. H. Smythe, M.R.C.V.S., of Camborne, forwarded to me a portion of the small intestine of a two-year-old South Down bull. The history given was that he had been purchased as a yearling and that within the last three months there had been progressive washing with an absence of diarrhœa. During the illness he was observed to fall forward into the manger on three occasions and had difficulty in rising. There was no reaction to the tuberculin test, and only a few strongyle ova were found in the fæces. About a fortnight prior to death the appetite was gradually lost.

A carefully conducted *post-mortem* examination revealed no lesions other than numerous very small scattered elevations of the mucous membrane of the small intestine.

On placing a small piece of the formalin preserved bowel under water in a petri dish and examining it with the low power of the microscope I found one or two rounded bodies to each field. To the naked eye they were just visible, as shining points, of a greyish white colour. In some cases they appeared to be very easily detached by means of a needle, whilst in others a portion of the mucosa came away with each cyst. The average diameter of six cysts which were measured, approximated 200μ, but there was great variation, some being very much less than this and some more than double.

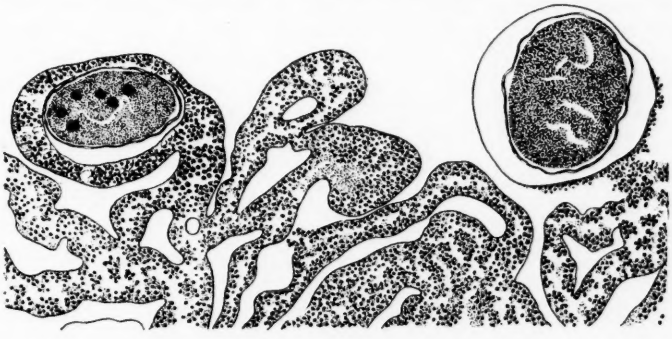

Fig. 1. Showing two cysts *in situ*.

Fig. 1 shows two cysts *in situ*, one being practically free and the other still surrounded by epithelium. When the cyst wall was ruptured and its contents spread out, two prevailing types of bodies were seen, viz. an elongated form with a nucleus at the blunt end, and a spherical form with many nuclei. Intermediate stages were also noted, suggesting that the elongated forms may be derived from the spherical ones as has been pointed out by Chatton[1] in the case of a similar parasite in sheep. Fig. 2 shows six of these bodies, with their measurements in microns. I am unable to say whether the parasite was the cause of the symptoms in this case; and although it is the first time that I have seen it, there is no doubt in my mind that it is *Globidium smithi*, of Raillet, 1919. Wenyon[2] says "The Rhinosporidia which produce nasal polypi have been usually classed with the Haplosporidia, but Ashworth (1923) has shown conclusively that they are fungi and not Protozoa, and this appears to be true of *Globidium* and possibly the Sarcosporidia." He gives accounts of *G. leucmarti* discovered by Flesch in 1883 on the intestinal mucosa of the horse, of *G. besnoiti* (Marobel, 1912) from the subcutaneous tissue and muscles of cattle, of *Gastrocystis gilruthi* (Chatton, 1910) from the mucous membrane of the fourth stomach and small intestine of the sheep and of certain

other forms, all of which appear to belong to the genus *Globidium*. According to Chatton (*loc. cit.*) *G. gilruthi* occurs often in the abomasum of sheep, and although the infection is usually slight, it is sometimes heavy, and as the cysts when mature rupture into the stomach, hæmorrhages and serious symptoms may be caused. Triffitt[3] found *G. gilruthi* in 92 per cent. of the sheep which he examined in this country.

Dr. Wenyon does not mention *G. smithi* in his book, but he kindly furnished me with Van Nederveen's account of a case and with numerous references to it. According to Railliet[4], Theobald Smith first noted it in 1893 in American cattle affected with Texas fever. Van Nederveen[5] described a case in a calf and says that it has been encountered in cattle by Smith, Marobel, Bugge and Müller. Certain workers have regarded the cyst as a stage in the reproductive cycle of the parasite of coccidiosis or of sarcosporidiosis, but from my examination of the available material I could find no support to these views.

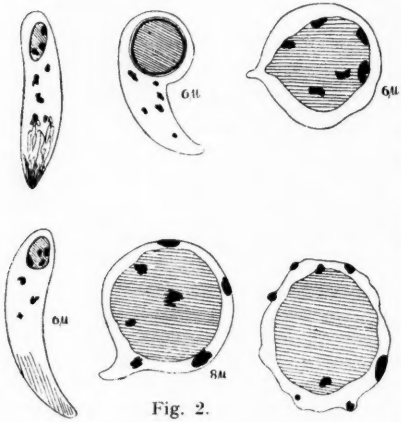

Fig. 2.

Mr. J. Motton, F.R.C.V.S., of Penzance, after inspecting the lesions and sections made from them informs me that several years ago he encountered a similar condition in three yearling heifers which died after having shown persistent diarrhœa. The nature of the lesion was investigated at the time, but was apparently not cleared up.

REFERENCES.

(1) Chatton, E. Le Myste de Gilruth dans la muquese stomacale des ovides. *Archiv. Zoo. Expr. V (N & R)*, CXIV.

(2) Wenyon, C. M. *Protozoology*, Vol. I, p. 769, 1926.

(3) Triffitt, M. J. Observations on *Gastrocystus gilruthi*, a parasite of sheep in Britain. *Protozoology*, No. 1, 7, 1925.

(4) Railliet, A. *Rec. de Méd. Vét.*, T95, 1919, Nos. 1 and 2.

(5) Van Nederveen, H. J. *Gastrocystus smithi* Railliet in den darmwand van het Rund. *Tidschrift voor Vergelijkende Geneesmunde*, Vol. VIII, p. 121, 1923.

XUM

Allantoido-Angiopagous Twin.

By W. LYLE STEWART, M.R.C.V.S.,
Armstrong College, University of Durham.

THE accompanying photograph illustrates a curious lamb monstrosity examined by me during the 1927 lambing season. The mother was a two-year-old ewe, a cross between a Cheviot and Blackface and carrying lambs for the first time. Nothing unusual was noted about this ewe, and in due course she was observed preparing

to lamb and at midday gave birth to a large healthy male lamb. Judging from the lamb's size and the age of the ewe, twins were not expected, but by chance she was placed in a shelter close at hand. Six hours afterwards the ewe was observed to be straining and the owner noticed what was thought to be the inverted uterus in the passage. Unaided, but after a severe struggle, the ewe was shortly delivered of this monster lamb, and within another ten minutes of a second strong, but smaller healthy female lamb.

XUM

External Appearance.

The general appearance of the monster was that of the abdomen and hindquarters of a large lamb, the head, neck, forelimbs and thorax of which were missing. The parts which represented the abdomen and hindquarters were imperfectly formed, and, although hock joints and tibiæ were present, phalanges and hoofs appeared to be absent owing to the skin being drawn completely over the extremities. The ventral and dorsal surfaces were rounded off anteriorly and behind this on the ventral surface was a large umbilical opening through which a coiled mass of viscera protruded. Posteriorly a well developed scrotum was present. This was about four times the normal size and was filled with fluid. The dorsal surface showed a slight depression near the anal position, but the anus was imperforate and the tail absent. The skin appeared normal and was covered with lamb wool, which gave place to abundant dark hair near the extremities. On palpation the carcass was soft, flabby and œdematous. When examined, it weighed 11½ pounds.

After partly dissecting the skin from the underlying tissue, much of the œdema escaped and the size of the monster was considerably reduced.

Internal Appearance.

An incision through the skin was made backwards from the umbilicus and to one side of the scrotum, and this exposed a small ill-defined abdominal cavity. The viscera which are seen in the photograph were attached to the dorsal surface of this cavity by folds of the peritoneum. Liver tissue was present, but neither bile-duct nor gall-bladder were recognised. Attached by membrane to the surface of the liver was a stomach and no differentiation into compartments, typical of the ruminant stomach could be discerned. Eighteen inches of looped intestines followed and the rectum ended in an imperforate anus posterior to the pelvic girdle. The intestines varied in thickness and for the most part appeared inflamed and of a dark colour, and when laid open contained a quantity of dark coloured epithelial debris.

The circulatory system was represented by a four-chambered heart lying below a peculiar structure resembling backbone and ribs, which had a ligamentous attachment to the pelvis. The heart muscle was very pale, an appearance no doubt due to the formalin, but sufficient blood and hæmoglobin was present to colour some of the large vessels red. Many blood vessels were present throughout the body and the umbilical arteries attached to the bladder were cord-like, but still possessed of a narrow lumen. Spleen, kidneys, testicles

and penis were present, the latter in the pelvic area together with a quantity of fat.

Skeleton.

The bony skeleton of the hindlimb was found to be complete, in that there were representatives of all the normal bones present, but they were abnormal in shape and development. The os inominatum was clearly divisible into its three component parts, the ilium, the pubis and the ischium. From the acetabulum an ill-formed femur stretched, and from there in the same line ran the tibia. The hock-joint was complete, all the usual bones being represented, but the os calcaneum was prolonged upwards as a kind of spur. The metatarsals were normal, but all the lower phalanges were fused rigidly together, and the os pedis was covered with a cartilaginous hoof. There was no joint movement in any part of the limb. The only other bony part of the skeleton was a curious structure which was attached by ligament to the sacral border of the ilium. The exact significance of this mass was difficult to determine, but from one pair of free ribs and several vestiges of ribs the mass probably represented the fused bony skeleton of the backbone and ribs. The skeleton was clothed with spongy embryonic tissue.

Discussion.

In human embryology allantoido-angiopagous twins are described as monochorionic fœtuses which communicate with each other by means of the vessels of their umbilical cords in the single placenta. One of the twins is usually fairly normal in structure, while the other shows an amount of deformity which is always considerable and sometimes extreme. Such twins are always of the same sex, so if the above can be applied to sheep this monster was probably a co-twin with the first lamb dropped, and furthermore the twins were probably uniovular. According to Ballantyne, uniovular twins may be ascribed to the penetration of one ovum by two spermatozoa, or perhaps to the presence of two germinal vesicles in one ovum. This monster corresponds closely to the acephalic type of allantoido-angiopagous twins described by Ballantyne, and stated by him to be relatively common in the human species. The deformed twin is really a parasite upon the normal twin by means of the vessels in the single placenta, and it is through the allantoic vessels that communication is established. Judging from the size and development of the monster and the lack of decomposition, it was apparent that antenatal life had continued until shortly before delivery, and it becomes a most interesting speculation as to what may have caused the unequal development. The co-twins were approximately equal in size and weight, and at least towards the end of the period of pregnancy would occupy an

XUM

equal space in the placenta, and exert an equal pressure. Although head elements were not recognised, it must be assumed that they were present, since it is inconceivable that the hindquarters could develop independently. Early in embryonic history the head elements are laid down and development proceeds from the head backwards. Starting off equally from the period when two embryos were formed in the blastocyst, the normal co-twin gradually beat the other in the struggle for life, and having crushed it, proceeded to keep it alive by communication through the vessels of their common attachment. The teratogenesis of allantoido-angiopagous twins would seem to resolve itself into a question of deformity and twinship, and it is not clear how much the former is due to the latter, or on the other hand, how much the twinship is responsible for allowing the deformed embryo growth and development. It is interesting to note that in the following lambing season the ewe in question gave birth to three perfectly healthy lambs, two males and a female.

My thanks are due to Professor Meeke, Professor Stuart McDonald and Mr. G. A. Mason of this University, with whom I have had the privilege to consult.

REFERENCE.

Ballantyne. Antenatal Pathology and Hygiene.

Difficulty Experienced in Diagnosis of Hæmorrhagic Septicæmia in Cattle.

By V. P. GOKHALE, G.B.V.C.,
Perak, F.M.S.

THIS short note is contributed with the object of bringing to the notice of the veterinary profession that occasionally considerable difficulty is met with in field work in arriving at a positive diagnosis of H.S., especially in cattle, and therefore great care must be taken to avoid making an incorrect report and adoption of wrong treatment.

During recent outbreaks of H.S. among cattle in the State of Perak, the following symptoms and *post-mortem* lesions were noticed in a majority of cases :—

(1) Fœtid diarrhœa, mixed with mucus and even dysentery in latter stages in several cases.

(2) Conjunctivitis : All grades of inflammation were seen from the engorgement of vessels with slight congestion as seen in rinderpest up to a scarlet condition of the mucous membrane which is absent in rinderpest. Lachrymation was in all cases watery unlike the muco-purulent discharge seen in rinderpest soon after commencement of the discharge.

(3) Ulceration and desquamation of the mucous membrane of the oral cavity and mouth swelling fœtid.

(4) Coat dry, rough, and staring (hide-bound).

(5) Loss of appetite from the onset of illness.

(6) Temperatures were taken of a fair number of affected animals, but a rise from 104° to 105° F. was found only in three cases.

Microscopic examination of smears taken from peripheral and heart blood of a number of animals was practically negative. More will be said about this later on.

The *post-mortem* lesions were almost identical with those seen in rinderpest, but this disease was ruled out for following reasons :—

(1) Absence of general elevation of body temperature.

(2) Very slight infectivity among the contacts.

(3) Non-existence of rinderpest not only in Perak but elsewhere in Malaya except Malacca from which place no cattle were imported.

(4) The course of the disease. It was in most cases too short for rinderpest, being variable, namely, a few cases dying after a very short illness (in such cases diarrhœa was generally absent), but the majority taking from three to eight days with rare recoveries.

As the blood examinations were at first quite negative, the sickness was thought to be due either to arsenical or lead poisoning as many of the symptoms and *post-mortem* lesions and the high mortality were very similar to those caused by poisoning by these substances. There was more reason to suspect lead poisoning from the history obtained that contamination of the water where cattle were watered had occurred from paint used for a tin dredge. Stomach contents and a piece of liver from two different cases were therefore sent to the Government Analyst, who, however, did not find any arsenic, lead or other metallic poison in the material. Upon receipt of this report H.S. was thought to be the only possible cause, but the main difficulty was in demonstrating the bip. bac. in the blood, although several smears from a number of animals during the early, as well as the later stages of the illness were examined. The Government Veterinary Surgeon, Mr. G. B. Purvis, F.R.C.V.S., found what he considered to be the bacilli of H.S. in the smears, but they were so rare (one per smear) that he could not rely upon the finding for diagnosis. Cocci were also present in the blood, and it is possible for a person trying to establish diagnosis to mistake two newly divided cocci for a bip. bac. Thereupon he made cultures from the blood of affected animals on potato and growth of the *Bac. bovisepticus* (*Pasteurella boviseptica*) was obtained and thus the etiology of the outbreak was established. I may mention here that Mr. Purvis had never seen H.S. before, and thus was handicapped adversely.

XUM

It may be doubted by some that the bac. of H.S. can be grown successfully on potato as no mention of this possibility seems to have been made in the older textbooks; but in the "Manual of Determinative Bacteriology," by Bergey, 2nd edition, p. 260, it is stated that a greyish growth on potato of *P. boviseptica* can be got, and this ability to grow on potato is used as his key to distinguish the species. The optimum temperature for growing the parasite is 37° C. Besides, this is the only Pasteurella that is known in cattle, naturally at least.

In the 3rd English edition of "Sp. Pathology and Therapeutics of the Diseases of Domestic Animals," by Hutyra and Marek, Vol I, p. 137, it has been stated that occasionally few bacteria (bip. bac.) exist in the blood as well as in the exudates of animals affected with H.S. and in such doubtful or negative cases it is advised to inoculate several test animals, especially rabbits. This test could not be carried out by the G.V.S., as no rabbit or even a guinea-pig was obtainable then, and so cultures had to be made.

It is rather an interesting fact that no outbreaks of H.S. in cattle in the F.M.S. had been recorded in the past. But an outbreak among buffaloes was recorded for the first time in Perak in 1925, although individual cases of the sub-acute œdematous type among buffaloes have been known to occur in the F.M.S. for the past twenty years at least.

I would like to mention that only the pectoral type of the disease was noticed among buffaloes, both of Siamese and Indian breeds, during the outbreaks of 1925 and 1927 and the bip. bac., although found in blood smears, was very rare; whereas in this year's (1928) outbreaks both among buffaloes and cattle, only the intestinal form of the disease was seen and bip. bac. in blood smears was not in sufficient number to determine diagnosis. The cutaneous œdema and swellings over the region of head, sub-maxillary space and throat were never noticed in the last outbreaks.

It will not be out of place to mention here that in Eastern Asia Buffalo-disease has been frequently mistaken for rinderpest, and this fact has been stated on p. 143 of Vol. I, 3rd edition (English) of "Sp. Path. & Ther. of the Dis. of Domestic Animals," by Hutyra and Marek.

Fracture of the Penial Bone in a Dog.

By KENNETH OLLERHEAD, M.R.C.V.S.,
Kensington, London. W.

On May 1st, in consultation with Mr. Vincent, M.R.C.V.S., of Sutton, I saw a most interesting and unusual injury.

The subject, a wire-haired fox terrier, was allowed to go for exercise unattended. One day during the second week of April he returned from his ramble somewhat subdued in spirits and evidently in pain, being noticed to lick the prepuce, the extremity of which was soiled with blood.

The owner took little notice of this for some days, but eventually sought advice, and on May 1st Mr. Vincent arranged to send the case up for consultation.

The general appearance of the dog was good, but on pushing back the prepuce it was seen that a full inch of the " penial " bone was completely stripped of all covering and protruded as a piece of greyish green necrotic bone from the centre of an angry granulating and enlarged stump.

Under morphia and Waite's Local Anæsthetic, the penis was withdrawn and secured ; a director was then inserted into the urethra and an incision half an inch long made along the ventral surface. The severed edges of the urethra were then drawn apart and sutured with catgut (three stitches on either side) to the *Corpus Cavernosum*. The fractured piece of the bone was then removed with small bone forceps and the parts cleansed with Bacterol.

In the course of eight days the wound healed satisfactorily and on the twentieth day the patient was discharged from hospital. On June 19th I received word from the owner that the dog had had no further trouble.

Cases of Prolonged Gestation, Superfœtation and Abnormal Pseudo-Pregnancy in the Rabbit.

By J. N. PICKARD, B.A.,

Animal Breeding Research Department, University of Edinburgh.

FOUR separate breeders have informed the writer of occurrences in their rabbitries which seem worthy of permanent record. Two of these cases are of prolonged gestation, one of superfœtation, and the fourth is of protracted pseudo-pregnancy associated with the fostering of youngsters. Whilst the owners are personally unknown to the writer, the histories have been verified as far as possible and are believed to be accurate.

Prolonged Gestation.

CASE A—ESSEX (Reported February 6th, 1928).—A Dutch doe was mated to her litter brother when about ten months old, on November 23rd, 1927. Contrary to the usual practice, the doe was left with the buck for several hours, but was removed the same day.

XUM

The doe did not kindle on the expected date (December 25th), but a fortnight later plucked herself and built a nest. On January 16th, 1928, this nest was examined and as it contained no young, the hutch was then completely cleaned. The following day (January 17th), 55 days after mating, the doe built a fresh nest and produced a litter of five unremarkable young.

The rabbits were attended to only by the owner and his wife. The hutches (five in two tiers of three and two hutches respectively) were placed along one side of the building and were raised two feet above the ground. The building was situated in a field surrounded by a barbed wire fence. During the period under consideration no rabbit escaped from its hutch, nor were two rabbits ever together.

CASE B—SURREY (Reported March 29th, 1928).—A Chinchilla doe was mated on February 15th, 1928, and was apparently normal until the 30th day of pregnancy, when she ate nothing but a little green food, and occasionally strained. Parturition, however, did not take place.

On March 29th, 43 days after mating, the doe was killed, and upon *post-mortem* examination eight young were found. Three of these were sent to the writer for examination and appeared perfectly normal but slightly larger than the average new-born rabbit of this breed. It is probable that they would have been born alive if the mother had not been killed.

Superfœtation.

CASE C—CUMBERLAND (Reported February 22nd, 1928).—A Havana doe was purchased from a well-known breeder and judge in April, 1927. The doe was mated on April 24th, 1927. On May 1st she produced a litter of six, evidently having been mated unknown to the new owner prior to the purchase. This litter did not thrive and died in less than a week. On May 24th she again gave birth to a litter of six, 23 days after the previous litter and 31 days after the mating secured by the new owner. Both litters appeared to be normal at birth, but in both cases and also in two succeeding litters, the young died. The cause of the death of these youngsters is not known, but coccidiosis is suspected.

Protracted Pseudo-Pregnancy and Fostering.

CASE D—HANTS (Reported July 7th, 1928).—A valuable Angora doe, now over three years, owned by a noted breeder and exhibitor, produced several litters up to the autumn of 1927, when she proved not to be in-kindle to a mating. She was again mated on February 24th, 1928, and appeared to be in-kindle, building a nest a few days prior

to the date when she was due. On the 31st day (March 26th) she did not eat and spent most of the day in the nesting compartment of her hutch, but did not produce a litter.

On the 36th day after mating the owner plucked the rabbit about the teats and put into her nest a pair of two days' old youngsters from another doe which had given birth to eight living youngsters. The foster mother immediately took a keen interest in them and at once her behaviour was altered, the doe becoming more active and eating voraciously. This pair of youngsters was left with her for 36 hours and then, as they appeared to have not been getting a sufficient supply of milk, were changed for a second pair. This pair was also changed at the end of 24 hours, although the owner considers that this transfer was probably unnecessary. A day later another youngster was given to the doe, making a total of three, five others being left with their true mother. The fostered youngsters were at weaning a trifle smaller than the five, but by July there was little difference, one being actually larger than two of the five.

The doe has again been mated, but proved not in-kindle and the fostering experiment is to be repeated.

Discussion.

CASES A AND B.—Hammond in his " Reproduction in the Rabbit " gives the normal gestation period of a rabbit as 32 days. He reports 40 days as the longest period amongst his records. Case A had a gestation period of 55 days, whilst Case B was pregnant for 43 days before being killed. The histories of these two cases are accepted by the present writer as authentic.

CASE C.—So far as the writer is aware this is the first case of alleged superfœtation in the rabbit to be recorded. The doe produced two litters, both of which were apparently normal with an interval of only 23 days between them. Hammond has shown that 30 days is normally the shortest period of pregnancy which would result in all living young, but this period may occasionally be slightly decreased to a minimum of 26 days. This, therefore, proves the impossibility of the second litter being the result of a mating after the birth of the first litter.

CASE D.—This case is of interest for the reason that pseudo-pregnancy normally ceases after the 20th day and that fostering on the part of a doe which has herself not recently littered is exceptional. This doe adopted youngsters from another on the 36th day after she had been mated. Her mammary glands were then active, but did not secrete milk abundantly until the young had been suckling for two days. The possibility of barren does being used for foster mothers is one that possesses considerable importance to the rabbit farmer.

XUM

Abstracts of Current Literature

Kropf, Rudolph.—A Case of Pure Osseous Tuberculosis.—*Wiener Tierärzt. Monatsschrift.* May 20th, 1928.

ABOUT a year ago I was called to a cow a few miles away. *Anamnesis:* The cow is advanced in pregnancy, stands only if supported, falling away in flesh; appetite good. Since tuberculosis had already occurred in this cowshed, examination in this direction was carefully made, but without any positive clinical evidence of its existence. *Diagnosis:* Cachexia. *Therapy:* Ergophor. *Advice:* Await parturition. If during suckling time no complete recovery, slaughter. On February 17th, 1928, called to the cow again. After passing improvement, condition worsens. The cow down for the most part, and when supported does not set her limbs. Emaciation is further advanced. The anterior extremities from the carpal joints downwards swollen and hard. Decubitus in both carpal joints. No cough; normal passage of dung and urine. Temperature 103½, respirations 60, pulse 80. Further examination in the lying position gives no noteworthy deviation from normal. Slaughter on February 20th showed purulent infiltration of the subcutaneous connective tissue of the swollen parts and necrosis of single parts of the left carpal joint as a result of decubitus; no other pathological changes. On removal of the shoulder it is found that the spongiosa of the corresponding vertebræ are typically tuberculous (reddish grey softened masses with yellow caseated deposits). Lungs and pleuræ macroscopically free from tuberculosis; also the abdominal organs.

Kropf, Rudolph.—Extensive Hæmorrhage of the Liver without Rupture of the Capsule.—*Wiener Tierärzt. Monatsschrift.* May 20th, 1928.

A cow, about 16 years old, has no appetite for eight days, and stands up badly. Sudden worsening of the condition necessitates slaughter. The liver appears tremendously enlarged, almost cylindrical, lobes effaced, on the dark bluish-red upper surface which showed no liver tissue structure numerous nut to apple size soft nodules, which are coloured dark red, bluish-red and brownish-red. Liver capsule intact; no blood in the abdominal cavity. Weight of the liver 66 lb. (the normal weight of the liver in cattle is 6¾ to 13¼ lb.). The parenchyma is permeated by numerous various sized, irregularly disposed lacunæ which are filled with whole or half-clotted blood and serum. The tissue in between appears almost throughout rotten, pulpy and greasy, and coloured dark brown. Only at certain places

is islet-shaped true normal liver tissue ascertainable. The remaining organs of the body show no changes. The cause of the hæmorrhage is not declared. Traumatic influences may be excluded on account of the patentcy of the liver capsule.

Zemaitis Juozas.—Anæsthesia of the Tail and Ear in the Dog.—*Wiener Tierärzt Monats.* May 20th, 1928.

After anatomical study of the nerves of the ear and tail in dead dogs, 50 patients were submitted to anæsthesia of these parts.

Technique of Injection.—(*a*) *Tail.*—The injection was made on the standing dog. The tail is taken in the left hand and drawn backwards and the intervertebral spaces between the first and second, or second and third vertebræ palpated with the thumb of the same hand. The injection needle is inserted in the median plane in the cranio-ventral direction through the skin between the sacrococcygeal dors. mediales and the lig interarcual in the epidural space, and the anæsthetic injected under moderate pressure into the epidural space.

(*b*) *Ear.*—The ear is stretched in the dorso-lateral direction, and with thumb and forefinger of the left hand the plainly palpable parotid gland at the base of the external ear passage is seized, and the needle inserted under the parotid close to the point of the forefinger in the direction of the base of the ear. After depositing the anæsthetic, the needle is withdrawn, and under the skin in the dorsal direction of the point of the ear the second deposit is made. The third injection is made under the skin in the triangle formed by the scutulum and the lateral crus helicis.

Investigations have shown that extradural anæsthesia in the dog is a suitable method for anæsthetising the tail and the region of the rectum. Indications for this method are: tail ulcers, necrosis of the tail, skinning of the tail, neoplasms, fractures, paræsthesia, myotomies, docking, tumours of the anal glands, abscesses and diseases of the anal pouch. The best anæsthetic proved to be a 2 per cent. novocain-suprarenin solution, of which young dogs took 2 to 3 c.m. and old animals 4 to 5 c.m., the injections being made slowly. Injections may be made cold or warm. Anæsthesia takes place after 10 to 15 minutes.

In anæsthetising the external ear of the dog the infiltration anæsthesia as used in the human subject has not been effective, but with conductive anæsthesia as given here, good results have accrued in all operations. The best dose in young dogs for complete anæsthesia of an ear is 3 to 4 c.m., in old dogs 5 to 7 c.m. of a novocain-suprarenin solution. Anæsthesia takes place in 15 to 20 minutes. This method is useful in anæsthesia of wounds, hœmatoma, ulcers, tumours, acne, etc.

Novocain-suprarenin tablets were used for making the solutions.

XUM

Gehrt.—Removal of Foreign Bodies from the Œsophagus in Cattle. —*Berliner Tierärzt Woch.* June 1st, 1928.

GEHRT has used an instrument like a corkscrew successfully in the removal of three awkwardly-shaped and firmly-fixed pieces of root from the œsophagus of cows. He covers the point of the corkscrew with his finger and considers it useful for the extraction of an apple, a potato or a piece of root. He casts the cow on the left side and has the head well extended.

Trepel, Dr.—A Case of Anthrax in a Dog.—*Berliner Tierärzt Woch.* June 1st, 1928.

ON March 2nd, 1928, a cow was slaughtered. The veterinary surgeon who saw the carcass, suspected anthrax, which was officially confirmed. Two of the owner's dogs had licked at the blood of the slaughtered animal. On March 6th, at mid-day, one of the dogs, a mongrel fox-terrier and sheep dog, nine years old, went off its food. There was a swelling of the throat. In the course of the afternoon the swelling increased, and there was difficulty in breathing. At 7 o'clock the dog died with stertorous breathing. The owner reported the death of the animal next day. There was a swelling of the neck half-way round, which on removal of the skin showed a damp, lardaceous, yellowish-white appearance. Tongue, larynx and pharynx apart from a slight inflammation of the pharynx were normal. The stomach and intestines were slightly inflamed. Liver and spleen were enlarged, and the latter had a dark red spot in the middle. Anthrax bacilli were isolated from the spleen pulp at the official institute of Stettin. On March 7th the second dog showed signs of illness and moved dejectedly about, but the owner gave it a tablespoonful of creolin dissolved in a litre of water during the day, and it recovered. A tablespoonful of creolin three times a day had been prescribed for the cows in the shed where the affected animal was.

Translations

Linseed Cake Poisoning in Sheep.

By M. PERROT.*

AN important branch of the rearing of sheep in the Ile-de-France consists in the fattening of the lambs. In order to raise their weight at four months to 35 or 40 kilogrammes (77 to 88 lb.), the dam must be fed specially either with meal or cake. On one farm linseed-cake

* *Recueil de Medecine Veterinaire*, January, 1928.

was used, the first ration having been given on November 10th last, and consisting of 150 grammes (a little over 5 oz.) per head per day, rising to 300 grammes (nearly 11 oz.) at the end of a fortnight.

On November 12th one ewe was found dead and another on the 30th.

At the beginning of December a number of lean sheep bought shortly before were put on the same rations as the ewes.

From this time onwards deaths occurred among the rams and ewes, seven of which died or had to be destroyed between the 15th and 22nd of December.

It was at this point that I was called in. The shepherd whom I questioned stated that he thought that the food was setting up severe inflammation in the sheep. A ewe and her lamb (ten days old), which I examined, were both ill. The ewe was lying on the ground, respiration was accelerated, the eyes injected, no sign of fever. It was very difficult to induce it to get up; when it did so I noticed a general stiffness, the spine appeared rigid, and the limbs did not bend when the animal moved. After a few steps it fell down again. The symptoms appeared similar to the first effects of a fatal dose of strychnine which has been injected in a dog. The lamb, whose only food was the ewe's milk, showed the same symptoms. According to the owner ewes which showed the same symptoms died soon after, and he decided to slaughter the one I had seen.

I admit that I was doubtful as to the diagnosis. After setting aside several causes that appeared to be indicated, I thought that this might be a case of poisoning, although the food appeared to be of good quality. Only the linseed-cake attracted my attention, and then merely because the ration seemed rather high. I did not feel very satisfied that I had traced the source of the trouble, especially as it did not seem to account for the lamb's illness, but, nevertheless, I recommended my client to stop or at least reduce the ration of cake and replace it by barley meal. My client did not seem to receive this advice with much favour, as his father, he told me, had fed linseed-cake up to 500 grammes (15 oz.) a day without ill-effects. However, he acceded to it to some extent as the ewes were taken off the cake, the rams still receiving the same ration.

After my visit, and during the whole of January, none of the ewes was ill, but the rams showed several deaths until January 6th, when their ration of cake was reduced, being made up with barley-meal. On January 21st a tired animal brought in from the herd died after being given about 150 grammes (about 5 oz.) of cake per day for a few days.

XUM

On February 6th and 7th two more animals died after being fed on more cake owing to a shortage of barley-meal. The ration of cake was again reduced and during February there were only two deaths. From March onward beet was used instead of barley, and although the fattening up became slower no deaths occurred until April 22nd, when a four-month-old ewe died after the ration of cake had again been raised through the shortage of beet.

During the six months in which the cake was used my client lost 9 ewes out of 400 and 8 rams out of 280, besides 25 lambs of from a few days to four months of age, which died while yet with the ewe or after being fed on the cake.

I had several opportunities to examine the meat from the slaughtered animals, but I found no lesions, nor were there any signs of fever or congestion.

My client had had a sample of the cake analysed, but nothing had been found. However, on testing it myself I obtained signs of prussic acid, or, rather, of the cyanogenetic glucoside linamosine, and this appeared to be the cause of the trouble; Professor Moussu, in consultation, agreed with this view, and an analysis in an official laboratory gave 0·043 grammes of prussic acid in 100 grammes of cake.

A high dose of poison would have been expected if it were to account for the death of the lambs, since the poison eliminated in the milk of the ewes set up similar symptoms in the lambs. In my opinion this can be explained by the fact that the food was given out to 50 or 100 animals at the same time, so that heavier eaters might well consume 7 to 800 grammes instead of 150 to 300, an equivalent of 0·350 grammes of hydrocyanic acid. Kauffmann in his "Treatise on Therapeutics," gives 0·40 grammes as toxic dose for the horse, in the form of 20 grammes of a 2 per cent. solution (i.e. 5/7 of a fluid ounce of a 2 per cent. solution, or about 7 grains). Moreover, the weaker animals would be more easily affected, as shown by the one from the herd referred to above.

In regard to the treatment I think it can only be preventive as the onset of illness is so rapid.

Clinical Studies on the Toxicity of Cyanogetic Linseed Cake.

By M. QUENTIN, D.V.M.,*
Crépy-en-Valois (Oise).

THE paper was presented to the Academy by M. Dechambre, Several accidents observed recently among his *clientèle* have given

M. Quentin the opportunity of studying clinically the progress of the intoxication and of making at the same time tests with the linseed-cake concerned. The facts ascertained by M. Quentin are fully in accord with those noted by Richart and Brioux in the memoir presented at the last sitting. It seems useful to supplement it by showing the actual dangers from linseed-cake and the methods of forewarning against them.

From the clinical side M. Quentin studies the symptoms of intoxication by cyanogenetic linseed-cakes in the ox, and then the sheep in fatal, serious and benign cases. The clinical characteristic signs of these intoxications are :—

1. General disturbance, more or less grave, of *a nervous type* (action on the bulbus), trembling, somnolence, stupor, prostration, staggering, falling. Of *respiratory type*, marked dyspnœa, with a respiratory pause if the intoxication is deep, irregular acceleration of breathing in less massive intoxication. Of *digestive type*, going from simple diarrhœa, more or less abundant, to profuse hæmorrhagic and true dysentery.

2. These symptoms appear suddenly a few days, eight to nine on an average, after taking a new lot of cake.

3. Return to normal state on suppression of the toxic food when the gravity of the condition is not too marked.

In cases of serious accidents one can advantageously use the known antidotes : solutions of sulphate of iron and carbonate of soda, official hydrogen peroxide diluted in five volumes of water, nitrate of cobalt, cardiac tonics. As noted by Richart and Brioux sugar or treacle is also to be recommended.

Autopsies have shown rumen, reticulum, omasum normal ; abomasum, on the other hand, shows very interesting lesions : reddish liquid, wine-coloured dregs abundant, mucosa greatly congested, infiltrated, of reddish brown colour, mahogany, intestine filled with liquid like that in abomasum ; with similar indications on the mucosa as in the abomasum ; presence in the colour of blood clots ; liver slightly hard, kidneys apparently intact to the naked eye, spleen slightly enlarged and softened ; lungs highly congested, pulmonary parenchyma brownish red, sub-pleural emphysoma ; heart, normal, with inflammatory endocarditis strewn in hæmorrhagic points.

With a hint as to the possibility of intoxication by linseed-cake diagnosis is easy. To confirm or nullify one must not be content with a casual examination of the suspected cake, or a reference to

XUM

" linseed-cake of excellent quality, very good standard," but take a reaction with picro-iodised paper, a simple and easy reaction which the practitioner can make at the time.

M. Quentin has noted the appearance of the reddish brown tint of the paper, and in the intensity of the colouration, extensive variations which correspond to the cypher of hydrocyanic acid liberated by the cake and which confirm the remarks already made on this point by Richart and Brioux. The chemical or toxicological laboratory can estimate the dose of prussic acid present. All cakes which give off 400 milligrams to the kilogramme have caused accidents These are of variable gravity with the contents of the cake and the quantity consumed. As regards the latter point one must remember that certain greedy animals ingest large quantities compared with their companions.

Certain foods, notably pulps, lacto-pulps, and ensilage given concurrently with cake, have been accused of determining the dilution of the *linamarin* (the nitrogenous glucoside which, on hydrolysis, yields prussic acid G.M.), and rendering toxic a cake normally harmless. M. Quentin strongly contests this view. If the cake only contains very little prussic acid it cannot evidently, in any case and with whatever complementary foods used, bring about toxic accidents.

The observation has been made in a herd of 52 young beasts receiving distillery pulp and ensilage with 4 kilogrammes of linseed cake of a dose of 70 milligrams to the kilogramme. No troubles at all have occurred, whereas, according to the preceding opinion all the factors were present to cause such an accident.

Finally, it may be stated that toxic accidents in ordinary practice depend :—

1. On the quantity of cake given and its richness in prussic acid (determining cause).

2. On the greater or less rapidity of diluting the *linamarin*.

3. On the consistence of the cake, the soft being less dangerous, the hard and very hard having caused serious accidents.

4. On the action of water ; hot water favours the dilution of the *linamarin*. The preparation as a drink appears the quickest way to intoxicate an animal. M. Quentin suggests that linseed-cake should never contain more than 80 milligrams of hydrocyanic acid to the kilogramme.

* *Bulletin de L'Académie Vétérinaire de France*, May, 1928, published by *Recueil de Médecine Vétérinaire de l'Ecole d'Alfort.*

Reviews

Wiener Tierarztliche Monatsschrift. April 10th, 1928. Price 16½ marks per annum.

THIS is a monthly journal written in German and published by Urban and Schwarzenberg of Vienna and Berlin. It is a live Continental periodical and is the official publication of the Austrian veterinarians, and of the Veterinary and Microbiological Societies of Vienna. The contents, of which this number is a specimen, are divided up into original articles, literature, reports of the Vienna Veterinary Society and the Microbiological Society, high school news—contributions from the Austrian Veterinary Surgeons' Association. Under the heading of "Literature" concise extracts are given from a wide range of English and foreign publications and books are reviewed. The original articles comprise an account of research into vesicular vaginitis by Reisinger and Reimann, an article on a metastatic sarcoma of the parotid, and inhalation therapy in diseases of the air passages. This monthly periodical is always well produced and edited and is very valuable and interesting to readers of German.

Handbuch der Vererbungswissenschaft. Von E. BAUR and M. HARTMANN. Band III. Leiferung 2. Entstehung der Haustiere von B. Klatt. 107 pp., 15 Figs. 1927. Berlin: Gebrüder Borntraeger. 15 marks.

THE present issue is one part of a large number (33) which will go to make up a three-volumed work on heredity, and which will appear from time to time. From the prospectus one gathers that it will be very complete, for it will embrace all the zoological, botanical, biological, cytological, and experimental aspects of all the studied groups of animals and plants; with special attention to the side-issues of plant and animal breeding. Prof. B. Klatt, of Hamburg, deals in the number before us with the genesis of the domesticated animals. The first half of the work is devoted to the effects of domestication upon the animals we use, whilst the remainder deals with their history. The descent of cattle, sheep, camels, swine, horses, canines and a few other animals and birds receives detailed attention under separate headings. The researches of Lydekker and of Ewart in this country receive due consideration. There is an extensive bibliography.

L'Industrie de la Viande en Republique Argentine. By DR. J. E. RICHELET, Delegate of the Ministry of Agriculture of the Argentine Republic. A Report addressed to the Congrès International du Froid, Rome, April, 1928. 70 pp. Paris: Société Industrielle d'Imprimerie.

THE author of this report has summarised in less than 60 pages the history of the Argentine meat industry and shown how the present situation in the international chilled and frozen meat trade has arisen, and he has done so in the form of a very interesting narrative. This constitutes the first part of the report, and deals with such divers factors

XUM

as breeding, transport, finance, etc., as have affected the production of preserved meat in the Argentine and other countries.

Dealing first with the question of breeding, the author shows how, at first by private enterprise and later with the encouragement of the Government, the present high grade of stock has been obtained in the Argentine. The process of selection was at first complicated by the fact that the hides of the cattle were then of far greater value than the meat, which indeed was usually left to the " cimarrones " or wild dogs. At present record prices are paid for Argentine cattle, and it is interesting to note that of the 327,000 heads of pedigree cattle registered with the Argentine Rural Society 88.83 per cent. are of British origin. The Herd Book shows a percentage of 90.45 British, and the Stud Book 60 ; similarly, 75 per cent. of the pedigree pigs are of British origin.

Although a small trade in livestock had long existed in the Argentine, the meat trade of that country could never have reached to its present importance if a satisfactory solution had not been reached to the problem of transport and, incidentally, preservation. Nevertheless, attempts to prepare extracts of meat by the Liebig process were made as early as 1863, and, shortly after, large factories were put up in various parts of the country for that purpose. British companies were first in the field, and British capital was largely instrumental in developing the chilled and frozen meat trade subsequent to Carré and Letellier's invention of the refrigerating plant. Up to 1908 there were no competitors to British interests, but in that year American capital entered the field with such success that in 1923 60 per cent. of the foreign capital in the Argentine was American. The author discusses the intricate financial history of that period, and deals at length with the formation of pools and trusts which led to the present virtual world monopoly, together with the influence of such trusts on the development of the meat industry in his country. It may be said that in a sense the earlier portion of this historical survey has been written merely as an introduction to the subsequent discussion of the present world monopoly ; the author reports adversely on this monopoly, and his " discussion " has much of the nature of an indictment. He concludes with some interesting proposals with regard to the control of the meat trades, and, since these are summarized in the " Conclusions " of the " Congrès International du Froid," to which the report is addressed, the latter merit special mention. For example, the Congress " urge the League of Nations, the International Institute of Agriculture at Rome, the International Institute of Artificial Cold at Paris . . . to make an inquiry into the present situation of world trade in frozen meat, sources of production, breeding, stocks, and the influence of powerful combines such as the ' Conference ' of Rio de la Plata ; in a word to evolve suitable measures by which to safeguard the adequate provision of meat for human consumption."

The second part of the report, although shorter than the first, is perhaps of even greater interest to the veterinary profession. It is a critical study of the systems of meat inspection adopted in various countries with particular attention to the necessity for uniform methods throughout the world, applied by qualified veterinary surgeons. Here again the Congress's proposals afford a measure of the scope of the report : " The International Institute of Artificial Cold " shall hold an

international conference " to elaborate a method of inspection of home-bred and imported meats," and " it is recommended to the governments of all countries to employ veterinary surgeons in the inspection of meat . . . since veterinary surgeons, by the training they undergo . . . . are best qualified to form an opinion as to the condition of meat and subsidiary products."

The whole report must be of great interest to all those connected with the meat trade, and our popular and much esteemed colleague, Dr. Richelet, is to be congratulated on having treated so wide and intricate a subject in such a lucid and interesting fashion.—P.

Poisonous Plants on the Farm. By H. C. Long, B.Sc. (Miscellaneous Publications, No. 57, Ministry of Agriculture and Fisheries.) Price 2s.; quarter bound, 2s. 6d.; cloth, 3s.; net and post free.

It will not be denied that the branch of toxicology, dealing with British plants poisonous to livestock, has not received the degree of attention that its importance warrants.

Those who have had experience of stock raising in the British Isles know that many cases of fatal vegetable poisoning are encountered during the course of each year. Such losses could be prevented were the farmer able to recognise and eradicate the causal poisonous plants.

The handbook reviewed is a link in the education of the agriculturist towards these ends and is therefore very welcome.

The book is clearly illustrated and well edited, and should be of service to both the agricultural and veterinary student in his studies.

Whereas most rural dwellers can recognise the various ornamental shrubs, few are acquainted with the plants found growing in fields, hedgerows and marshy places. It is not generally known that such common plants as the various species of the buttercup family are capable of causing grave illness to livestock, or that the hemlocks, more especially the *Conium maculatum* and the *Oenanthe crocata*, cause the deaths of many yearling and adult cattle annually.

Many farmers readily allow the refuse from large gardens to be dumped on to their land, little realising the unfortunate consequences that may arise from the ingestion of border plants, such as aconite, or clippings from shrubs, such as yew.

The inclusion of poisonous plants and seeds in feeding stuffs comes under a somewhat different category, and in many cases can only be recognised by the agricultural or analytical chemist.

The question of eradication is dealt with in a special article and also under individual plants; even more space might be devoted to this all-important branch of the subject.

One observes a long list of plants suspected of possessing poisonous properties, and it is pleasing to note that the Ministry of Agriculture and Fisheries is fully aware of the lack of definite knowledge in this respect.

The author and the publishers are to be congratulated on producing a very useful work, but at the same time one may remark that in certain respects it is a confession of ignorance regarding the toxicity of the British flora.—A. R. S.

XUM

Two Gems.

THE best way to keep trespassers out is to adequately fill the field. If the practitioner is conspicuously better qualified than any other person to meet the veterinary needs of his community, the field is filled and not until then. The perpetuation of the profession and its elevation on to a higher plane is the responsibility of the veterinarian of to-day. We should be professional eugenists—we should now be selecting our successors.—*Programme of Michigan State College Veterinary Short Course.*

THE objects of this association are to promote good fellowship; to elevate the standards of veterinary education; to cultivate medical science and literature; to protect and promote the professional interests of the veterinarian; to direct public opinion regarding problems of animal hygiene; to contribute to the diffusion of true scientific knowledge among its members and increase the efficiency of veterinary service in the live stock industry.—*Banquet programme, Iowa Veterinary Medical Association.*

The Early Bird.

DR. VERANUS A. MOORE, of the New York State Veterinary College, Ithaca, N.Y., left on June 8th, for California, to aid the University of California in organising work on the infectious diseases of poultry and other animals.—*American Veterinary Review*, July, 1903.

Notices

Royal Veterinary College.

Opening Ceremony.

The Opening Ceremony of the Royal Veterinary College, Camden Town, will take place at 3 p.m. on Tuesday, October 2nd, when Sir Merrik Burrell, Bart., the Chairman of the General Purposes Committee of the Governors, will give the address. Practitioners, together with students and their parents and friends, will be welcomed as guests.

Publishers' Notices

All communications should be addressed to 7 & 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière, Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Copy of advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 25th of the month, or if proof is required, not later than 23rd.

Binding Cases for Volume 83 and any other previous volumes can be obtained from the publishers. Price 2s. 9d. post free.

Annual Subscription, 21s. ($5.00 U.S.A. currency) post free.